

**U.S. Army Corps of Engineers
Omaha District**

**Final Site-Specific Work Plan
Cold Springs Bombing Range
FUDS Property No. F10OR0172**

**Site Inspections at Multiple Sites, NWO Region
Formerly Used Defense Sites
Military Munitions Response Program**

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ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
µg/L	microgram(s) per liter
AOC	area of concern
ASR	Archives Search Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
DoD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
Final Type I Work Plan	<i>Final Type I Work Plan, Site Inspections at Multiple Sites, NWO Region</i>
FSP	Field Sampling Plan
FUDS	Formerly Used Defense Site
GPS	Global Positioning System
HRS	Hazard Ranking System
IDW	investigation-derived waste
MC	munitions constituents
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSP	Munitions Response Site Prioritization Protocol
NBEC	nitrogen-based explosive compounds
NCP	National Oil and Hazardous Pollution Contingency Plan
NDAI	No Department of Defense Action Indicated
NWO	Northwest Region Omaha District
ODEQ	Oregon Department of Environmental Quality
PA/SI	Preliminary Assessment/Site Inspection
PCB	polychlorinated biphenyl
ROE	right-of-entry
SAP	Sampling and Analysis Plan
Shaw	Shaw Environmental, Inc.
SI	Site Inspection
SQL	sample quantitation limit
SSHP	Site Safety and Health Plan
SSWP	Site-Specific Work Plan
TAL	target analyte list
TPP	Technical Project Planning
USACE	U.S. Army Corps of Engineers
USC	United States Code
UXO	unexploded ordnance

1.0 INTRODUCTION

This Site-Specific Work Plan (SSWP) presents the information necessary to conduct field activities associated with a Site Inspection (SI) being performed at the former Cold Springs Bombing Range, also known as the Cold Springs Precision Bombing Range Military Reservation. The SI field activities will consist of site reconnaissance for munitions and explosives of concern (MEC), and sampling and analysis of soil and sediment for munitions constituents (MC).

1.1 Project Authorization

The U.S. Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) to address DoD sites suspected of containing MEC or MC. Under the MMRP, the U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at Formerly Used Defense Site (FUDS) for the Army, the DoD Executive Agent for the FUDS program.

Pursuant to USACE Engineer Regulation 200-3-1 (USACE, 2004a) and the *Management Guidance for the Defense Environmental Restoration Program* (DoD, 2001), the USACE is conducting FUDS response activities in accordance with the Defense Environmental Restoration Program statute (10 United States Code [USC] 2701 et seq.); the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601); Executive Orders 12580 and 13016; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulation [CFR] 300). As such, the USACE is conducting remedial SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

While not all MEC/MC constitute CERCLA hazardous substances, pollutants, or contaminants, the Defense Environmental Restoration Program statute provides DoD the authority to respond to releases of MEC and MC, and DoD policy states that such responses shall be conducted in accordance with CERCLA and the NCP.

Shaw Environmental, Inc. (Shaw) has prepared this SSWP for the USACE, under USACE Contract No. W912DY-04-D-0010, as a supplement to the *Final Type I Work Plan, Site Inspections at Multiple Sites, NWO Region, Formerly Used Defense Sites, Military Munitions Response Program* (Shaw, 2006). This document is hereafter referred to as the Final Type I Work Plan. Shaw is responsible for conducting SIs at FUDS in the USACE Northwest Region Omaha District (NWO) Military Munitions Design Center.

1.2 Site Name and Location

The former Cold Springs Bombing Range (FUDS Property No. F10OR0172) is located in Umatilla County, Oregon, approximately 9 miles east of the Hermiston, Oregon (Figure 1).

The former range is situated on private land. The FUDS property boundary is shown on Figure 2. The Archive Search Report (ASR) (USACE, 1997) indicates that the entire area of the Cold Springs Bombing Range FUDS is approximately 2,622.08 acres, while the ASR Supplement (USACE, 2004b) indicates the area of the Bombing Target is 649 acres. The range area is a circle with a radius of 3,000 feet, the standard configuration for a practice bombing range. Features associated with the bombing range included a three-tower target, a pump house with well, and three spotting and plotting towers (USACE, 1997).

1.3 Scope and Objectives

The scope of the SI is restricted to evaluation of the presence of MEC or MC related to historical use of the FUDS prior to transfer of the property. Potential releases of hazardous, toxic, or radioactive wastes are not addressed within this scope. The intent of the SI is to confirm the presence or absence of contamination from MEC and/or MC. The general approach for each SI is to conduct a records review and site reconnaissance in order to evaluate the presence or absence of MEC and to collect samples at locations where MC might be expected based on the Conceptual Site Model (CSM) (Appendix A).

The primary objective of the SI is to determine whether conditions at the former Cold Springs Bombing Range warrant further response action pursuant to CERCLA and the NCP. The SI will collect the minimum amount of information necessary to (i) eliminate from further consideration those releases that pose no significant threat to public health or the environment; (ii) determine the potential need for removal action; (iii) collect or develop additional data, as appropriate, for Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (EPA); and (iv) collect data, as appropriate, to characterize the release for effective and rapid initiation of the remedial investigation and feasibility study process. A secondary objective of the SI is to collect the appropriate data to complete the Munitions Response Site Prioritization Protocol (MRSP) (DoD, 2005).

1.4 Site Inspection Process

The steps involved in conducting an SI include the following:

- Review of existing data,
- Application of the Technical Project Planning (TPP) process,
- Preparation of an SSWP,
- Performance of SI field activities (site reconnaissance, media sampling, and analysis),
- Preparation of an SI Report.

The TPP process is one through which project objectives and data collection processes are identified, and site stakeholders are brought together to discuss goals and objectives. This process includes the following phases:

- Identification of the current project area;
- Determination of data needs;
- Development of data collection options; and
- Finalization of the data collection program.

A multi-disciplinary team of key stakeholders attends a TPP meeting(s) in order to participate in the process so SI activities can be conducted in a timely and efficient manner.

1.5 Munitions Response Site Prioritization Protocol

The DoD is required to assign a relative priority for each munitions response site (MRS) within a munitions response area (MRA). This process is to be completed for all DoD sites including FUDS, which are known or suspected of containing unexploded ordnance (UXO), discarded military munitions, or MC.

Definitions:

- Defense Sites—Locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage, or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions (10 USC 2710(e)(1)).
- Munitions Response Area—An MRA refers to any area on a Defense Site that is known or suspected to contain UXO, discarded military munitions, or MC. Examples are former ranges and munitions burial areas. An MRA can be comprised of one or more MRSs (32 CFR 179.3).
- Munitions Response Site—A discrete location within an MRA that is known to require a munitions response (32 CFR 179.3). An MRSPS scoring is completed for each MRS.

1.6 TPP Summary

The TPP meeting for the former Cold Springs Precision Bombing Range was conducted on April 19, 2007, at the Hermiston Conference Center located in Hermiston, Oregon.

Representatives from the NWO, USACE - Seattle District, the Oregon Department of Environmental Quality (ODEQ) (via conference call), and Shaw were in attendance. In addition, a stakeholder representative of Royale Columbia Farms was in attendance. A separate public meeting was held in the evening of April 19, 2007, which was attended by stakeholder representatives of Stahl Hutterian Brethren (Stahl Farm of Stanfield).

The USACE and the ODEQ came to mutual agreement with the approach and the decision rules that were developed during the TPP meeting and review of the Final TPP Memorandum (Shaw, 2007). Conclusions from the first TPP meeting include:

Areas of Concern (AOC): The AOC, the Bombing Range as presented in the ASR (USACE, 1997), was agreed upon.

Reconnaissance Objectives: The TPP team agreed that the SI would include reconnaissance activity to:

- Confirm site conditions and land usage,
- Confirm the CSM,
- Select optimal sample locations (biased toward evidence of MEC, if observed), and
- Observe evidence of MEC and munitions history.

MC Sampling: The TPP team agreed in principle that sampling for MC is appropriate for the site. The ODEQ agreed that analysis of the samples for explosives and metals was appropriate. It was also agreed that the results of the Preliminary Assessment/Site Inspection (PA/SI) Report (Weston, 2005) will be used to the extent possible to characterize the site. However, after reviewing the results of the PA/SI, which analyzed samples for nitrogen-based explosive compounds (NBECs) and the fact that explosives were not used at the site, it was recommended in the TPP Memorandum, and agreed upon by the regulators and USACE, that samples not be analyzed for explosives (Shaw, 2007). Following is a summary of the MC sampling:

- One soil sample will be collected at the location of MEC or munitions debris (MD) in the vicinity of irrigation circles #16 and #22. If no MEC or MD is located, a soil sample will be collected near the reported center of the bombing target at irrigation circle #16. The sample will be analyzed for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel).
- One soil sample will be collected in an area south of irrigation circle #16 in an area not impacted by irrigation and farming activities. The sample will be analyzed for select metals (aluminum, chromium, iron, copper, lead, manganese, and nickel).
- By agreement of the TPP team, one sediment sample will be collected to evaluate the surface water/sediment pathway. The sediment sample will be collected from a water collection area downgradient of the Bombing Target within a tributary of Despain Gulch. The sample will be analyzed for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel).
- No surface water or groundwater sampling is planned.

Background Sampling: The TPP team agreed in principle that background sampling for the site is appropriate. Ten background surface soil samples and one background sediment sample would be analyzed for select metals (aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc). Additionally, ODEQ suggested reviewing the PA/SI Report (Weston, 2005) to determine if any data could be used for background.

Screening Values: The ODEQ indicated that the EPA Region 9 residential Preliminary Remediation Goals for human health screening values have not been updated for a number of years. Therefore, ODEQ has requested that EPA Region 6 Preliminary Remediation Goals be used for evaluation.

Other Stakeholders: Landowners were present at the TPP meeting and were provided the right-of-entry (ROE) request documentation. Landowner-provided information with respect to site history, site conditions, land use, or other information relevant to the SI will be shared with the TPP team.

The USACE - Seattle District indicated that they would contact the Confederated Tribes of the Umatilla Indian Reservation regarding the planned investigation. During further discussions, the USACE District Project Manager indicated that in October 2006, the Army initiated conversation with the Umatilla Confederated Tribes during coordination of the Army's MMRP-SI activities on northeastern Oregon FUDS property. During those discussions, the Tribes acknowledged the SI would be primarily a visual and nonintrusive geophysical inspection. The SI would also include limited soil sampling as deep as 6 inches. Since the Tribes did not have resources to participate in the inspection, the Army agreed to contact the Tribes and the landowners if historic or cultural items were encountered. Therefore, the Tribes will only be contacted if historic or cultural items are encountered.

1.7 Decision Rules

The following is a list of decision rules that will guide Shaw's technical approach at various stages of the SI as the specific AOC is evaluated.

Determine if the site requires additional investigation or can be recommended for No DoD Action Indicated (NDAI) based on the presence or absence of munitions and explosives of concern.

Utilizing trained UXO personnel and handheld magnetometers, a visual reconnaissance will be conducted searching for physical evidence to indicate the presence of MEC (e.g., MEC on the surface, MD, craters, soil discoloration indicative of explosives). The visual search will consist of areas within the Bombing Target and specifically in the areas of irrigation circles #16, #20, and #22. The following decision rules will apply:

- The following reconnaissance results would support a recommendation for further action with respect to MEC:
 - Direct evidence is found of the presence of MEC (from historical records or SI activities) or evidence of potential MEC that is inconsistent with the Bombing Target CSM (e.g., use of munitions containing high explosives).
 - Direct evidence of MEC is not found, but abundant MD is identified suggesting a potential for the presence of MEC.

- If there is any indication that site users are exposed to MEC hazard, the site will be recommended for a removal action.
- The following reconnaissance results would support a recommendation for NDAI with respect to MEC:
 - Direct evidence of MEC is not found; MD is isolated and consistent with the Bombing Range CSM.
 - No evidence of MEC, MD, or magnetic anomalies is identified.

Determine if the site requires additional investigation or can be recommended for NDAI based on the presence or absence of MC above screening values.

Soil and sediment samples will be collected and analytical results will be compared to background. Results from previous investigations will also be included in the evaluation provided the analytical data meet data quality requirements developed for the SI. The following decision rules will apply:

- If sample results do not exceed background, the site will be recommended for NDAI relative to MC.
- If sample results exceed background, but are less than human health and ecological screening values, the site will be recommended for NDAI relative to MC.
- If sample results exceed both background and human health screening values, the site will be recommended for additional investigation.
- If sample results exceed background and ecological screening values but not human health screening values, additional evaluation of the data will be conducted in conjunction with the stakeholders to determine if additional investigation is warranted.

1.8 MEC Technical Approach

If MEC is found during SI field activities, the following excerpted procedures will be followed, per Interim Guidance Document 06-05 and Safety Advisory 06-2 (see Appendix B for complete document):

- The property owner or individual granting ROEs to the property will be notified of the hazard and advised to call the local emergency response authority (i.e., police, sheriff, or fire department). The individual will also be informed that if they do not call the local response authority within one hour, the individual who identified the UXO item will notify the local emergency response authority.
- The local response authority will decide how to respond to the reported incident, including deciding not to respond (e.g., if the local response authority is already aware of the hazards on the property). If the local response authority decides to respond, the individual who identified the item or his designee will mark the location of the item and provide accurate location information to the emergency response authority. The individual who identified the item or his designee will generally remain in the area until the local response authority arrives, unless specifically indicated by the appropriate response authority that the individual may leave the area.

- Neither the USACE personnel, nor their contractors have the authority to call Explosive Ordnance Disposal to respond to an explosive hazard. This call is the responsibility of the local emergency response authority for FUDS properties and it must come through the proper chain of command on installations.

The technical approach is based on the Final Type I Work Plan (Shaw, 2006), Final TPP Memorandum (Shaw, 2007), and the *Formerly Used Defense Sites, Military Munitions Response Program, Site Inspections, Program Management Plan* (USACE, 2005).

1.9 SSWP Organization

This SSWP supplements the Final Type I Work Plan (Shaw, 2006), which includes an Accident Prevention Plan and Site Safety and Health Plan (SSHP) (in Appendix D), and a Sampling and Analysis Plan (SAP, in Appendix E) that includes both the USACE SAP and the Shaw SAP. The SAPs contain the Field Sampling Plan (FSP) and the Quality Assurance Project Plan. The Final Type I Work Plan (Shaw, 2006), as amended by this SSWP, governs work that will be implemented during the SI at the Cold Springs Bombing Range. This SSWP provides additional information not available in the, including site information (background information, summary of historical documents evaluated, and resulting data needs), a discussion of activities to be conducted prior to mobilizing to the field, a presentation of field data to be collected, and appendices with supporting documents. Specifically, this SSWP includes the following sections:

- Section 1.0 Introduction,
- Section 2.0 Site Information,
- Section 3.0 Pre-Field Activities,
- Section 4.0 Site Inspection Activities,
- Section 5.0 Investigation-Derived Waste,
- Section 6.0 Proposed Schedule,
- Section 7.0 References,
- Figures,
- Tables,
- Appendix A Conceptual Site Model,
- Appendix B USACE Interim Guidance Document 06-05 and Safety Advisory 06-2, and
- Appendix C Site Safety and Health Plan Addendum.

2.0 SITE INFORMATION

2.1 Installation History

Private parties owned the land prior to the Army. The land was used for grazing and livestock. A total of 2,622.08 acres of land was acquired via purchase and leased in December 1941 and

January 1942, by the Army, for use as a precision bombing range for target practice. The site was used by several assigned military units for day and night training missions, including a squadron (the B-24 Bomber and the C-45 Cargo Aircraft) stationed at the Walla Walla Army Air Field. Three plotting and spotting towers, a pump house with well, and a three-tower target were the features associated with the bombing range.

The site was used from 1942 to 1946 as a practice bombing range. Only M38A2 100-pound practice bombs filled with sand or flour were used at the FUDS. The site was declared surplus in October 1946 by the Army and was disposed of in August 1947.

The ASR (USACE, 1997) reported that a document dated November 19, 1947, indicated “The lands have been examined and have been cleared of all explosives or explosive objects reasonably possible to detect by visual inspection.”

2.2 Physical Setting

2.2.1 Access and Land Use

The former Cold Springs Precision Bombing Range or Cold Springs Bombing Range is located approximately 9 miles east of the city of Hermiston in Umatilla County, Oregon (Figure 1).

Private parties owned the land prior to the Army. The land was used for grazing and livestock; currently, the land is privately owned and used for irrigated farming. There is a small landing strip north of the FUDS. An underground pipeline crosses the FUDS property. Information has not been found indicating the type of pipeline. However, it is assumed to be a natural gas pipeline. Further information will be gathered during the visual reconnaissance.

The location of the former bombing range has been heavily cultivated and used for farming. However, portions of the former target area lie between crop circles, which have remained uncultivated. Native vegetation covers the target area, which is located on a slight ridge.

The primary landscape feature is high plain dessert with low-lying vegetation. The Columbia River, which is located approximately 5 miles north of the bombing target has a local average elevation of 250 feet. Elevation at the bombing target is 750 feet mean sea level.

2.2.2 Climate

The Cold Springs Bombing Range is located approximately 9 miles east of the city of Hermiston, Oregon. Precipitation is seasonal with an average of only 10 percent of the rainfall occurring between July and September. The average total precipitation is approximately 9 inches. The average annual maximum and minimum temperatures are 65.5 degrees Fahrenheit (°F) and 40°F, respectively (Western Regional Climate Center [www.wrcc.dri.edu]). Average annual snowfall is about 10 inches. The prevailing wind direction is from the southeast.

2.2.3 Geologic and Hydrogeologic Setting

The Cold Springs Bombing Range is located within the Columbia Basin in northeast Oregon. The bedrock beneath Cold Springs Precision Bombing Range consists of basaltic rocks of the

Columbia River Basalt Group created from a thick sequence of volcanic flows that erupted between 12 and 17.5 million years ago. The basalt has a maximum thickness of 4,000 feet. The weight of the basalt has caused faulting throughout the area. Melt water from receding glaciers, flooding events, and prevailing winds has caused the basalt layer to be overlain with alluvial deposits of sand, gravel, and silt.

Groundwater occurs in interflow zones between individual lava flows. A shallow unconfined aquifer occurs in the alluvial sediments of the lower Umatilla Basin. The principal water-producing zones of the alluvial aquifer occur in deposits of coarse sand and gravel that fill three northeast-trending troughs between Boardman, Oregon and Cold Springs Reservoir. Multiple confined aquifers occur in the underlying basalt flows. The alluvial and shallowest basalt aquifers are the main sources of domestic water for rural residents in the area. The alluvial aquifer is also a major source of municipal water for the cities of Hermiston and Irrigon, and an important source of irrigation water (Oregon Water Resources Department. 2003). Regional flow in the alluvial aquifer is generally either west to the Umatilla River, or northwest to the Columbia River. However, flow direction varies considerably over space and time due to local topography and surface water flow. Flow directions vary in the underlying basalt. There are no public water supply wells within the 4-mile Target Distance Limit and the site is not located with a wellhead protection area.

Cold Springs Bombing Range is located in the northeastern corner of the Lower Umatilla Basin Groundwater Management Area, located in Morrow and Umatilla counties, Oregon. The ODEQ declared the Lower Umatilla Basin a Groundwater Management Area in 1990 when groundwater sampling during the 1980s demonstrated high nitrate levels in groundwater, including irrigated agriculture, land application of food processing waste, livestock operations, domestic sewage, and military activities.

2.3 Previous Investigations

2.3.1 Historical Records Searches

Historical documents were reviewed to collect information about the former Cold Springs Bombing Range. A summary of these documents is provided below.

- An ASR was issued in June 1997. The ASR documented that the Cold Springs Bombing Range was used for practice bombing using the M38A2, practice bombs (USACE, 1997). Numerous M38MA2 remnants littered the northern and southern slopes of the target area. No intact spotting charges were found. There is no historical evidence that the range was ever used for gunnery practice.
- Historical documentation revealed concerns associated with the sites including accidental bomb releases and numerous fires reportedly caused by practice bombs. Two accidental bomb releases occurred in May 1945 (the ASR does not present information on the type of bomb):

- One of the accidental bomb releases was due to an erroneous release by the lead bombardier of a six ship formation. The 15 released bombs were located and disposed of.
- The second accidental release was the result of improperly adjusted bomb rack controls. The exact location of the bombs was not determined.
- On May 17, 1995, personnel from the USACE - St. Louis District conducted a site visit. The team met with Mr. John Walchli, a long-time resident and lessee (USACE, 1997). Mr. Walchli informed the team of numerous discoveries of practice bomb remnants he made, and that he buried a large quantity of that material in the eastern portion of irrigation circle #22. Additionally, he showed the site inspection team a live 37-millimeter (mm), point detonating artillery round, which he unearthed in approximately 1975 from what is believed to be irrigation circle #20. Markings indicated it was an M55A1 practice round; however, it had an M56 fuze (which is highly explosive and point-detonating). The round was likely dropped from a P-39 aircraft and is not from site-related activities (USACE, 1997). The team also met with Mr. Harold Nakamo (representative for Makami Farms). Mr. Nakamo indicated the greatest concentration of bomb remnants he observed was at irrigation circle #16 (USACE, 1997).
- An ASR Supplement was completed in 2004 and indicated one range, the Bombing Target (USACE, 2004b).
A PA/SI was conducted by Weston for the EPA in 2004. Field sampling was conducted in December 2004 and the PA/SI report was issued to the EPA on April 25, 2005 (Weston, 2005). Numerous practice bombs and bomb debris were observed at the target area. The following summarizes the PA/SI:
 - Soil, sediment, surface water, and groundwater samples were collected at potentially contaminated source areas and from areas that may have been contaminated by the migration of contaminants from their respective sources and analyzed to characterize the potential sources (i.e., the target area).
 - Contaminants of concern included target analyte list (TAL) metals, NBECs, and perchlorate.
 - A total of 26 characterization samples were collected and analyzed.
 - Three surface soil and three subsurface soil samples were collected at the bombing target in an area with the most concentrated practice bomb debris.
 - One soil sample was collected from the inside of a bomb casing located at the bombing target.
 - One soil sample was collected from the caliche soil located northwest of the bombing target. Perchlorate may occur naturally in caliche soil.
 - Seven surface water and six sediment samples were collected from various downstream locations.
 - Five groundwater samples were collected from privately owned domestic wells located within 3 to 9 miles from the Bombing Target.
 - Additionally, one surface soil, sediment, and surface water background sample was collected.

- All samples were analyzed for TAL metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc), NBECs, and perchlorate (Method 314.0). Additionally, all surface water and groundwater samples were also analyzed for perchlorate by EPA Method 8321A-modified. Five surface water samples also were analyzed for pesticides and polychlorinated biphenyls (PCBs).
- For groundwater, the metals were not significantly above background. Perchlorate was detected in three of the five samples (0.25 to 1.2 micrograms per liter [$\mu\text{g/L}$]). NBECs were not detected.
- For sediments, metals were detected above background levels. Perchlorate and NBECs were not detected.
- For surface water, metals were detected above background. Perchlorate was detected in all seven samples at concentrations ranging from 0.035 $\mu\text{g/L}$ to 12 $\mu\text{g/L}$. NBECs and pesticides/PCBs were not detected.
- For soils, metals were detected above background. Perchlorate was detected in one sample (SS-CB001) at 0.83 milligrams per kilogram. NBECs were not detected.

2.4 Munitions and Explosives of Concern and Munitions Constituents

The only documented use of the site was from 1942 to 1946 as a practice bombing range using M38A2 100-pound practice bombs with spotting charges. The M38A2 practice bomb is a sand-filled or flour-filled bomb. The spotting charge contained black powder or a smoke mixture. Historical evidence indicates MD litters the site. No MEC is likely to be present from the practice bombs.

A practice 37-mm practice projectile with a nonstandard point detonating sensitive fuze was found by a landowner in approximately 1975. Discovery of the projectile was an anomaly since the range was not designed or used as a 37-mm site. No other MEC or MD associated with the 37-mm has been reported.

The MC associated with the type of munitions used on the range is summarized in Table 1.

3.0 PRE-FIELD ACTIVITIES

3.1 Coordination with State Historic Preservation Office

According to the ASR (USACE, 1997), no significant historic or cultural resources were found to be present on the lands, which contain the former Cold Springs Bombing Range. This assumption has been confirmed with the State Historical Preservation Office by letter dated September 19, 2007.

3.2 Coordination Regarding Natural Resources

The ASR (USACE, 1997) states that three (one avian and two fish) federally-listed threatened or endangered species may be in the vicinity of the site. However, the Oregon Department of Fish

and Wildlife, the U.S. Fish and Wildlife Service, and the Oregon National Heritage Information Center have been contacted to determine the presence of threatened or endangered species present at the former Cold Springs Bombing Range.

3.3 Coordination of Rights of Entry

Per section 2.5.2 of the Final Type I Work Plan (Shaw, 2006) and as the geographic USACE District office for the former Cold Springs Bombing Range, the Project Manager from the USACE - Seattle District office is responsible for obtaining the ROEs for the property where the SI activities will be performed. Access to identified property is necessary for conducting field activities. Table 2 identifies the property of interest and the status of obtaining the ROEs. All necessary ROEs have been obtained.

3.4 Equipment

A four-wheel drive vehicle will be necessary for access, since improved and unimproved dirt roads exist within the area. All investigation areas can be reached from roads within the area. A hand-held fluxgate Schonstedt instrument will be used to support the reconnaissance efforts. A hand-held Global Positioning System (GPS) receiver unit will be used for traverses and to document any surface remains, document the reconnaissance survey, and identify the location of MEC, if found.

3.5 Communications

The primary means of on-site communication will be cellular telephones or radios. The two-person Field Team (and any other accompanying parties) will remain together throughout all aspects of the field activities.

3.6 Training and Briefing

Any additional training will be conducted on site during the Daily Tailgate Safety Briefing, to include awareness of endangered species, culturally sensitive areas, and anticipated ordnance types. In addition, emphasis will be placed on the known presence of biota at the site.

4.0 SITE INSPECTION ACTIVITIES

The Bombing Target is the AOC for the former Cold Springs Bombing Range as indicated on Figure 2. A site inspection of the AOC will be conducted, which will include the following activities:

- Site reconnaissance,
- Surface soil sampling,
- Sediment sampling,
- Recording sampling and site information (using a hand-held GPS unit), and
- Photograph documentation.

All SI field activities will be conducted in accordance with the Final Type I Work Plan (Shaw, 2006) and SSHP Addendum (Appendix C). The SSHP Addendum is a supplement to the program-wide Accident Prevention Plan and SSHP contained in the Final Type I Work Plan. All SI field activities will be documented in the field logbook.

4.1 Key Personnel

This section identifies key project personnel and their specific roles and responsibilities for each SI activity conducted at the Cold Springs Bombing Range. Additionally, this section defines the responsibilities, authority, and the interrelationships of all personnel who manage, perform, and verify activities affecting quality, particularly for personnel who need the organizational freedom and authority to:

- Initiate action to prevent the occurrence of nonconformance,
- Identify and record and quality problems,
- Initiate, recommend, or provide solutions through designated channels,
- Verify the implementation of solutions, and
- Control further processing, delivery, or installation of non-conforming items until the deficiency or unsatisfactory condition has been corrected.

Project Manager – The Shaw Project Manager will have overall responsibility, authority, and accountability for the project. Mr. Peter Kelsall is the Project Manager. He will provide additional management or technical support when needed and will serve as the final reviewer on all technical documents produced for the project.

Chemical Quality Control Officer – The Shaw Chemical Quality Control Officer shall ensure that all chemistry-related objectives, including responsibilities for data quality objective definitions, sampling and analysis, project requirements for data documentation and validation, and final project reports are attained. Mr. Tim Roth will serve as the Chemical Quality Control Officer for this project.

Health and Safety Manager – The Shaw Health and Safety Manager is responsible for the development and implementation of the SSHP and SSHP Addendum for this SI. Ms. Pamela Moore will serve as the Health and Safety Manager for this project.

Technical Lead – The Shaw Technical Lead will oversee the technical aspects of the inspection activities. Mr. Anthony Searls will serve as the Technical Lead for this site. Although his presence is not required, Mr. Searls may act as a team member during field activities. He may also serve as and alternate Field Team Leader.

Field Team Leader – The Shaw Field Team Leader will be responsible for the management and execution of all field project activities in accordance with the approved work plan, and federal, state, and local laws and regulations. The Field Team Leader will function as the primary point

of contact for the stakeholders and field personnel. Mr. Anthony Searls will be the Field Team Leader for this investigation.

UXO Technician – The UXO technician will be responsible for the UXO avoidance measures to be implemented during field activities. David Watkins (USACE database #1420), Rob Irons (USACE database #1137), Jim Bayne (USACE database #1212), Rueben Rhodes (USACE database #0169), Ron Stanfield (USACE database #1161), or Dave Van Deman (USACE database #1057) will serve as the UXO Technician for this investigation.

4.2 Field Reconnaissance

This section discusses the visual surface reconnaissance planned for the bombing range.

4.2.1 Objectives

A visual surface reconnaissance along a proposed meandering path through portions of the FUDS will be conducted to identify MEC, MD (e.g., remnants of practice bomb casings), and/or other evidence of range activities (Figure 3). The actual path of the reconnaissance may vary from the plotted proposed path. The presence of MEC, MD, and other potential evidence of range activities will be identified and located.

The site reconnaissance will be performed by conducting a visual inspection of the range by a field team of two or more persons, including a qualified UXO technician. The UXO technician will supplement the visual inspection with the use of a hand-held magnetometer (or similar) in areas where vegetation or soil cover may obscure potential ferrous objects. The path walked during the reconnaissance will be recorded using a hand-held GPS unit. Reconnaissance will not include detailed mapping. The reconnaissance will be concentrated in the bombing target area. The reconnaissance path will include the areas where practice bomb debris was observed during the ASR site visit and the PA/SI (Weston, 2005). Reconnaissance will also extend into other selected portions of the FUDS, mainly into crop circle #20. The area near crop circle #20 is reportedly where a 37-mm point detonating artillery round was discovered; however, it is not from site-related activities. The range was not designed or used as a 37-mm site. The anticipated total length of the proposed meandering reconnaissance path is 27,000 linear feet.

If MEC is observed at any point during field activities, the field team will respond according to the requirements of the SSHP and SSHP Addendum (Appendix C) and make appropriate notifications in accordance with USACE direction (Appendix B). Further reconnaissance for the purpose of determining the presence or absence of MEC will be terminated, and further reconnaissance will be limited to the minimum amount necessary to document site conditions and determine appropriate sample locations. If evidence of munitions activity is observed that is inconsistent with the CSM described in Appendix A (e.g., if debris from high-explosive munitions is found), notification will be made to the USACE and ODEQ, and a variance to this SSWP would be submitted to initiate appropriate changes to the SI approach.

4.2.2 Document General Site Conditions

The following conditions will be recorded in the field logbook and documented by digital photographs:

- Access limitations;
- Land use (agriculture, development, buildings, campgrounds, etc.);
- Vegetative cover and habitat (noting especially any distressed populations);
- Presence or potential presence of wildlife;
- Wetlands or other features that would qualify the site as an Important Ecological Place;
- Soil conditions (including staining);
- Presence or absence of surface water (streams, ponds, etc.); and
- Any activities that could result in contamination.

4.2.3 Document Evidence of Military Activities

The following conditions will be recorded in the field logbook and documented by digital photographs:

- Presence or absence of MEC, shell casings, bullets or bullet fragments, or other MD;
- Coordinates of specific observation points, such as sample locations or locations of MD (using a hand-held GPS unit); and
- Location and physical description of range features such as firing points, berms, targets, observation posts, craters, and foxholes.

4.2.4 Sample Location

Reconnaissance will also be used to select optimal sample locations; such as, samples will be biased to locations with evidence of former munitions activity, if observed. The following conditions will be recorded in the field logbook and documented by digital photographs:

- Rationale for selecting sample location (e.g., presence of MEC or MD, staining, distressed vegetation),
- Description of sample location (e.g., face of berm, in front of target), and
- Soil conditions (as appropriate).

Background sample locations will be selected based on similarity to soils within the AOC and on accessibility. Locations adjacent to roads or other man made features will be avoided.

4.3 Sampling

This SSWP details sampling by media planned at the former Cold Springs Bombing Range, as discussed during the TPP meeting and documented in the Final TPP Memorandum (Shaw, 2007). By agreement of the TPP team, one sediment sample will be collected to evaluate the surface water/sediment pathway. Soil and sediment samples will be collected based on the

decision matrix described in the following sections. Sample location rationale is provided in Table 3.

In all instances, samples will be collected using clean, new, disposable sampling equipment, such as, a spoon or scoop and bowl. Nondisposable tools, such as a spade, shovel, or trowel, may be used to remove vegetation and roots prior to collection of the soil sample.

All soil and sediment samples will be collected in accordance with this section and Shaw Standard Operating Procedures T-FS-101 and T-FS-124 of Appendix E of the Final Type I Work Plan (Shaw, 2006). Sample designations and quality assurance/quality control sample requirements are summarized in Table 4.

4.3.1 Soil

Six composite surface soil samples will be collected from the Cold Springs Bombing Range AOCs. These samples will be obtained from the following locations:

- One soil sample will be collected in an area south of irrigation circle #16 in an area not impacted by irrigation and farming activities.
- One soil sample will be collected near the reported center of the bombing target and in the vicinity of the center pivot of irrigation circle #16.
- A maximum of four contingent surface soil samples will be collected within the bombing target, with focus on the area within and between irrigation circles #16 and #22. The samples will be located in the field based on the results of the visual reconnaissance. Note: These samples are an addition and were not discussed in the Final TPP Memorandum.

The exact locations of soil samples will be determined during the site inspection based on the visual identification of the AOC and the reconnaissance survey. The general areas of soil sample collection are illustrated on Figure 4.

Surface soil samples will be collected at a depth of approximately 0 to 6 inches below ground surface. Each surface soil sample will be a composite sample (7-point, wheel pattern with a 2-foot radius). No subsurface samples are planned.

During the TPP meeting it was recommended, and agreed by the ODEQ, that the samples be analyzed for metals and explosives. However, after reviewing the results of the PA/SI (Weston, 2005), which analyzed samples for NBECs and the fact that explosives were not used at the site, it was recommended in the final TPP Memorandum (Shaw, 2007) that samples not be analyzed for explosives. Samples will be analyzed by EPA Method 6020A for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel). These metals are considered potential MC; aluminum, iron, and manganese may also serve as reference elements for a geochemical evaluation of background distributions, if needed.

During the PA/SI (Weston, 2005), three surface soil samples (SS-CB001 through SS-CB003) were collected at the Bombing Target area (Figure 4) and analyzed for TAL metals by

EPA SW-846 Method 6020A, NBECs by EPA Method 8330A, and perchlorate by EPA Method 314.0. Metals (arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, nickel, silver, vanadium, and zinc) were detected above their sample quantitation limits (SQLs) but not in significant quantities compared to background soil values. Perchlorate and NBECs were not detected, except for one detection of perchlorate at 0.83 milligrams per kilogram in a surface soil sample (SS-CB001). Note that perchlorate has not been identified in any of the munitions used at the Cold Springs Bombing Range and is not considered a potential MC. Additionally, the soil screening level for perchlorate is 55 milligrams per kilogram.

4.3.2 Sediment

By agreement of the TPP team, one sediment sample will be collected to evaluate the surface water/sediment pathway. One sediment sample will be collected from a water collection area downgradient of the Bombing Target within a tributary of Despain Gulch. Samples will be analyzed by EPA Method 6020A for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel). These metals are considered potential MC; aluminum, iron, and manganese may also serve as reference elements for a geochemical evaluation of background distributions, if needed. The sediment sample will be collected from 0 to 2 inches in depth but will be discrete samples in order to retrieve material from specific, localized, water collection areas.

During the PA/SI (Weston, 2005), one sediment sample (SD-UT001) was collected in an unnamed tributary to Despain Gulch downgradient of the Bombing Target (Figure 4) and analyzed for TAL metals by EPA SW-846 Method 6020A, NBECs by EPA Method 8330A, and perchlorate by EPA Method 314.0. Metals (aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, silver, vanadium, and zinc) were detected above their SQLs with some constituents (cobalt, lead, and silver) significantly above their background sediment values. Perchlorate and NBECs were not detected.

4.3.3 Background

Ten background surface soil samples will be collected (Figure 4). The composite soil sample locations will be determined in the field from areas that do not appear to have been impacted by past site operations. Surface soil samples will be collected at a depth of approximately 0 to 6 inches below ground surface.. Each surface soil sample will be a composite sample (7-point, wheel pattern with a 2-foot radius). Additionally, one background sediment sample will be collected as a discrete sample.

The soil and sediment samples will be analyzed for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel).

During the PA/SI, one background soil sample (SS-BK001) was collected north of Cold Springs and one co-located set of sediment (SD-BK001) and surface water (SW-BK001) background samples were collected from Cold Springs on Royal Columbia Farms property (PA/SI Summary,

Figure 3-2) (Weston, 2005). The soil sample was analyzed for TAL metals, NBECs, and perchlorate (Method 314.0). The sediment and surface water samples were analyzed for metals, pesticides/PCBs, perchlorate (Method 314.0), and NBECs. Additionally, the surface water sample was also analyzed for perchlorate by Method 8321A-modified. Perchlorate was detected in the background sediment sample from Method 314.0 (7.68 µg/L) and Method 8321A-modified (7.6 µg/L). Sample SW-BK001 was initially assumed to be a background location because it is located upgradient of the site; however, perchlorate was detected in the sample. Therefore, a background sample from another study was used for evaluation during the PA/SI.

4.3.4 Background and Screening Values

A comparison of site sample data to background data will be necessary to distinguish a munitions-related release from ambient conditions resulting from naturally occurring or anthropogenic sources. Where the body of background data includes sufficient samples (in this case surface soil), a background threshold comparison of site concentrations to the background 95th upper tolerance limit or 95th percentile, as appropriate, will be made (EPA, 1989, 1992, 1994, and 2002). If one or more site samples exceed the background threshold, the following tests may also be applied:

- A nonparametric comparison of the central tendencies or medians of the site and background distributions, using the Wilcoxon rank sum test (EPA, 1994, 2002, and 2006).
- A geochemical evaluation using correlation plots of trace element versus reference element concentrations (EPA, 1995; Myers and Thorbjornsen, 2004), for any element that fails either of the above two statistical tests.

Where the body of background data is limited (in this case sediment), the site-to-background comparison will be conducted according to guidance for SI activities and HRS scoring (EPA, 1992). Background concentrations for analytes are taken to be the maximum values observed in the limited background data set (EPA, 1995). A comparison is then made to determine if a hazardous substance in the media is “significantly above the background level” according to the HRS criteria (40 CFR Appendix A to Part 300, Table 2-3):

1. If the sample measurement is less than or equal to the SQL, no observed release is established.
2. If the sample measurement is greater than or equal to the SQL, then:
 - If the background concentration is not detected, an observed release is established when the sample equals or exceeds the SQL.
 - If the background concentration equals or exceeds the detection limit, an observed release is established when the sample is three times or more above the background concentration.

Background threshold values, for comparison to site data per the above HRS criteria, are three times the maximum detected background concentration. For analytes not detected in background

samples, the background threshold is the SQL. The results from the Weston background (2005) and Shaw background samples will be evaluated to determine the appropriate background value.

Site sample data that exceed background concentrations will be compared to the appropriate human health screening criteria to determine if additional investigation should be recommended. Table 5 lists the human health screening criteria for this SI. Tables 6 and 7 list the ecological screening criteria for this SI. A consensus concerning the criteria to use was reached during the TPP meeting. The human health screening criteria for surface soil and sediment are EPA Region 6 Medium-Specific Screening Levels.

4.3.5 Analytical Program

Definitive target analyses for samples collected from the Cold Springs Bombing Range consist of the following list of analytical suites:

- For source and background soil and sediment samples - select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel) by EPA SW-846 Method 6020A.

Soil and sediment samples will be analyzed using EPA SW-846 methodology as presented in Section 5.0 of the NWO FUDS Quality Assurance Project Plan, Appendix E of the Final Type I Work Plan (Shaw, 2006).

Chemical data will be reported via a hard-copy data package and electronic format following the requirements described in the Shaw SAP/FSP Sections 7.1 and 7.2, Appendix E of the Final Type I Work Plan (Shaw, 2006). These data deliverables will be validated in accordance with the requirements referenced in Shaw SAP/FSP Section 8.2, Appendix E of the Final Type I Work Plan.

4.3.6 Quality Assurance/Quality Control Samples

Quality control samples, including field duplicates and matrix spike/matrix spike duplicate samples, will be collected as detailed in Table 4. The USACE NWO Military Munitions Design Center has directed that no quality assurance (field split) samples will be collected for the SI at this site.

4.3.7 Sample Preservation, Packaging, and Shipping

Sample preservation and packaging requirements are provided in Shaw SAP/FSP Tables 4-1 and 4-2 in Appendix E of the Final Type I Work Plan (Shaw, 2006). Sample shipment will follow the procedures specified in Shaw SAP/FSP Section 4.0 in Appendix E of the Final Type I Work Plan. Completed analysis request/chain-of-custody records will be secured and included with each shipment of coolers per Shaw SAP/FSP Section 7.1.3, Appendix E of the Final Type I Work Plan.

All samples will be shipped to the following:

GPL Laboratories, LLLP

7210A Corporate Court

Frederick, Maryland 21703

Phone: 301.694.5310

Fax: 301.620.0731

Attention: Sample Receiving/Virginia Zusman

5.0 INVESTIGATION-DERIVED WASTE

Inspection-derived waste (IDW) will be managed in accordance with Section 3.7 of the Final Type I Work Plan, and Shaw SAP/FSP Section 9.0, Appendix E of the Final Type I Work Plan (Shaw, 2006). Based on knowledge of the site and the materials and processes involved, the site is pre-characterized as not contaminated by listed or characteristic hazardous wastes. IDW will be managed as nonhazardous unless field observations or other evidence indicates otherwise.

The following types of IDW will be managed as specified in the Final Type I Work Plan:

- Personal protective equipment and disposable equipment (i.e., disposable sampling scoop): Bagged and routed to a municipal landfill; and
- Decontamination fluid: Poured on ground surface.

6.0 PROPOSED SCHEDULE

The proposed schedule for field activities and reporting is provided below. The timing of the field activities assumes there will be no delays because of inclement weather.

December 2007 – Submittal of Final SSWP,

December 2007 – Field activities,

January 2008 – Submittal of Draft SI Report,

February 2008 – Review of Draft SI Report,

March 2008 – Submittal of Draft Final SI Report,

April 2008 – Review of Draft Final SI Report, and

June 2008 – Submittal of Final SI Report.

7.0 REFERENCES

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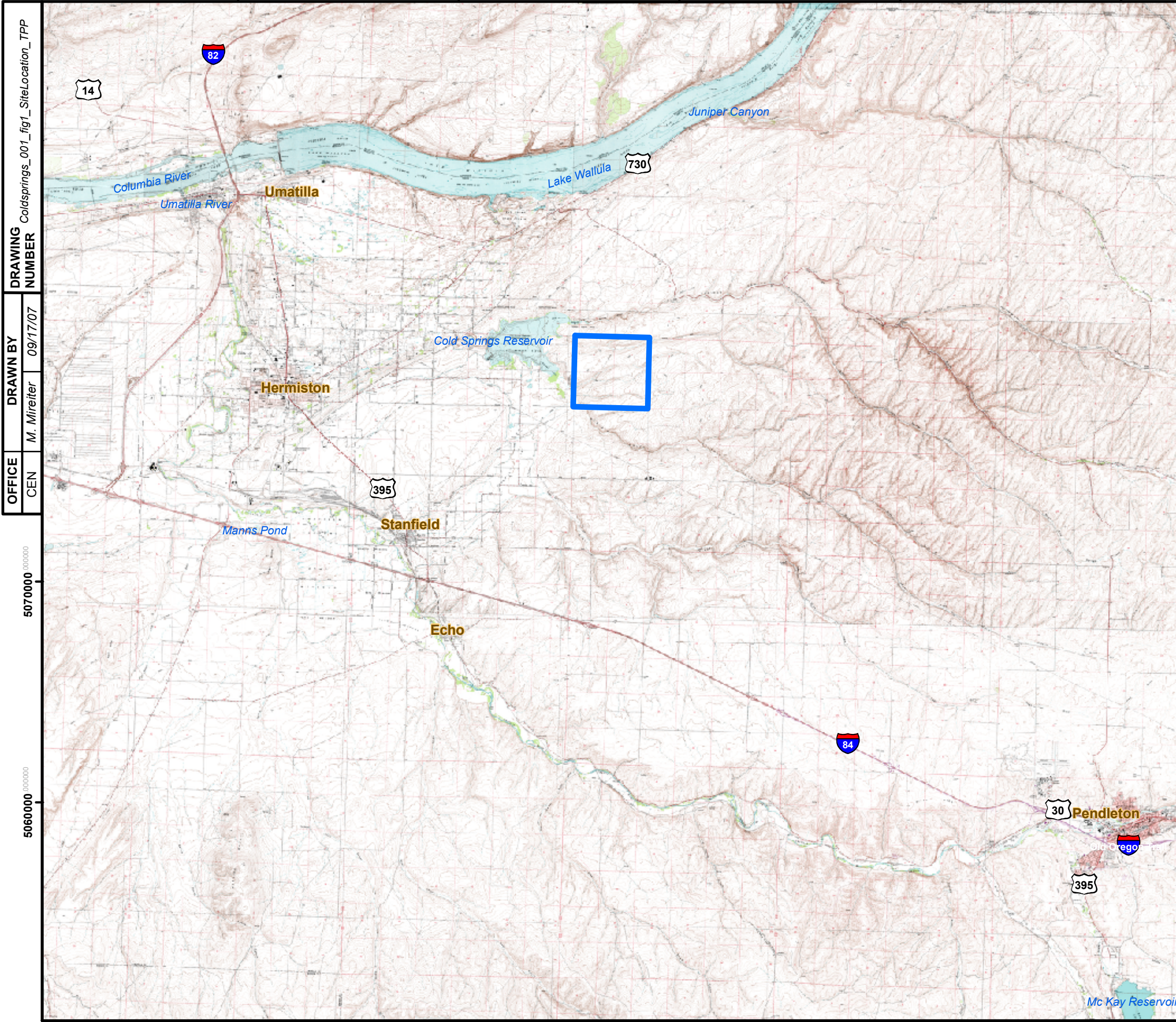
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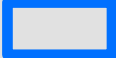
FIGURES



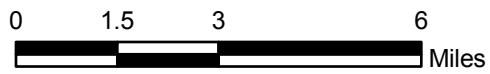
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Legend

 Cold Springs Bombing Range FUDS Boundary

NOTES:
1) FUDS boundary was derived from the Cold Springs Bombing Range ASR Supplement.
2) This property is located within the Umatilla Watershed.
3) Topo map (Umatilla County) obtained from the U.S. Department of Agriculture, Service Center Agencies, 1999.

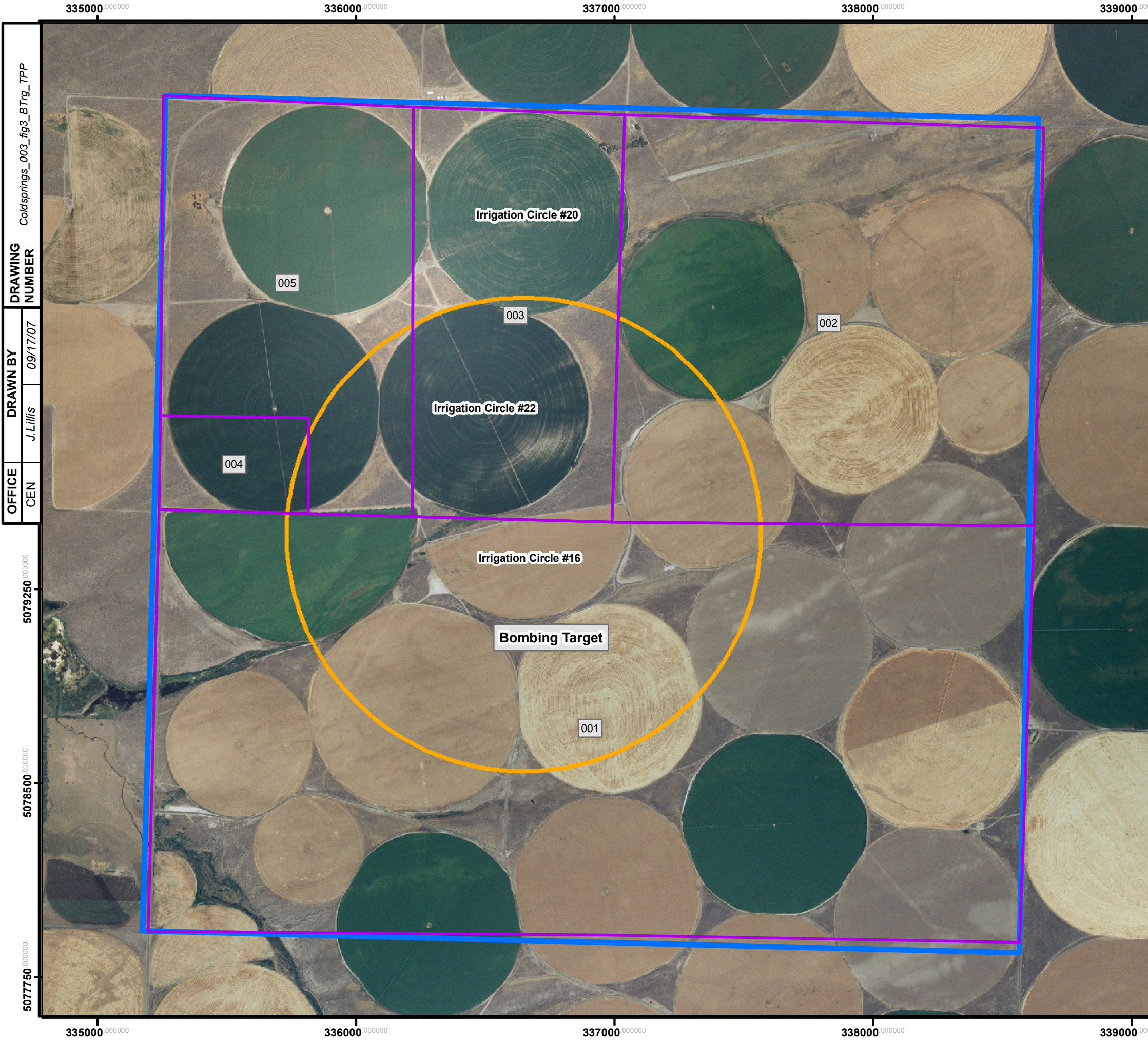


REFERENCE/PROJECTION: NAD 83 UTM Zone 11N



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FIGURE 1
SITE LOCATION
COLD SPRINGS PRECISION BOMBING RANGE



Legend

Cold Springs Bombing Range FUDS Boundary

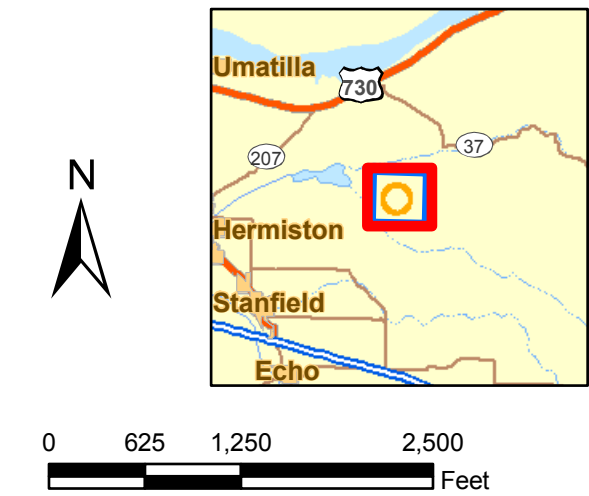
Range Included in the MMRP Range Inventory

Taxlot Parcel

NOTES:

1) FUDS and range boundaries were derived from the Cold Springs Bombing Range ASR Supplement.

2) Aerial photo (Umatilla County) obtained from the U.S. Department of Agriculture, Service Center Agencies; photo is from the USDA-AFPO National Agricultural Inventory Project, 2005.



REFERENCE/PROJECTION: NAD 83 UTM Zone 11N



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FIGURE 2
SITE LAYOUT
COLD SPRINGS PRECISION BOMBING RANGE

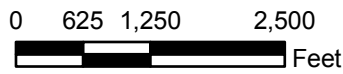
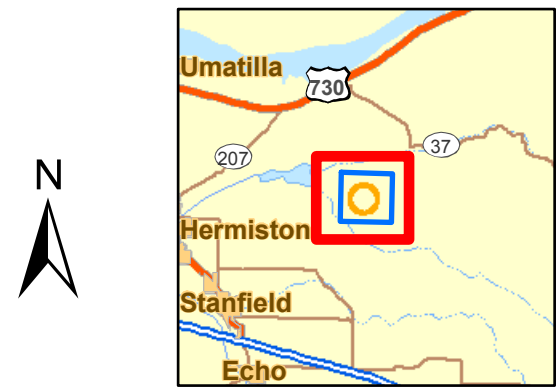
 Shaw Environmental, Inc.



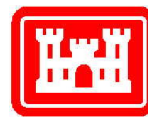
Legend

- Cold Springs Bombing Range FUDS Boundary
- Range Included in the MMRP Range Inventory
- Bombing Target
- 500-Foot Radius Bombing Target Area
- Proposed Reconnaissance Path

NOTES:
1) FUDS and range boundaries were derived from the Cold Springs Bombing Range ASR Supplement.
2) Aerial photo (Umatilla County) obtained from the U.S. Department of Agriculture, Service Center Agencies; photo is from the USDA-AFPO National Agricultural Inventory Project, 2005.

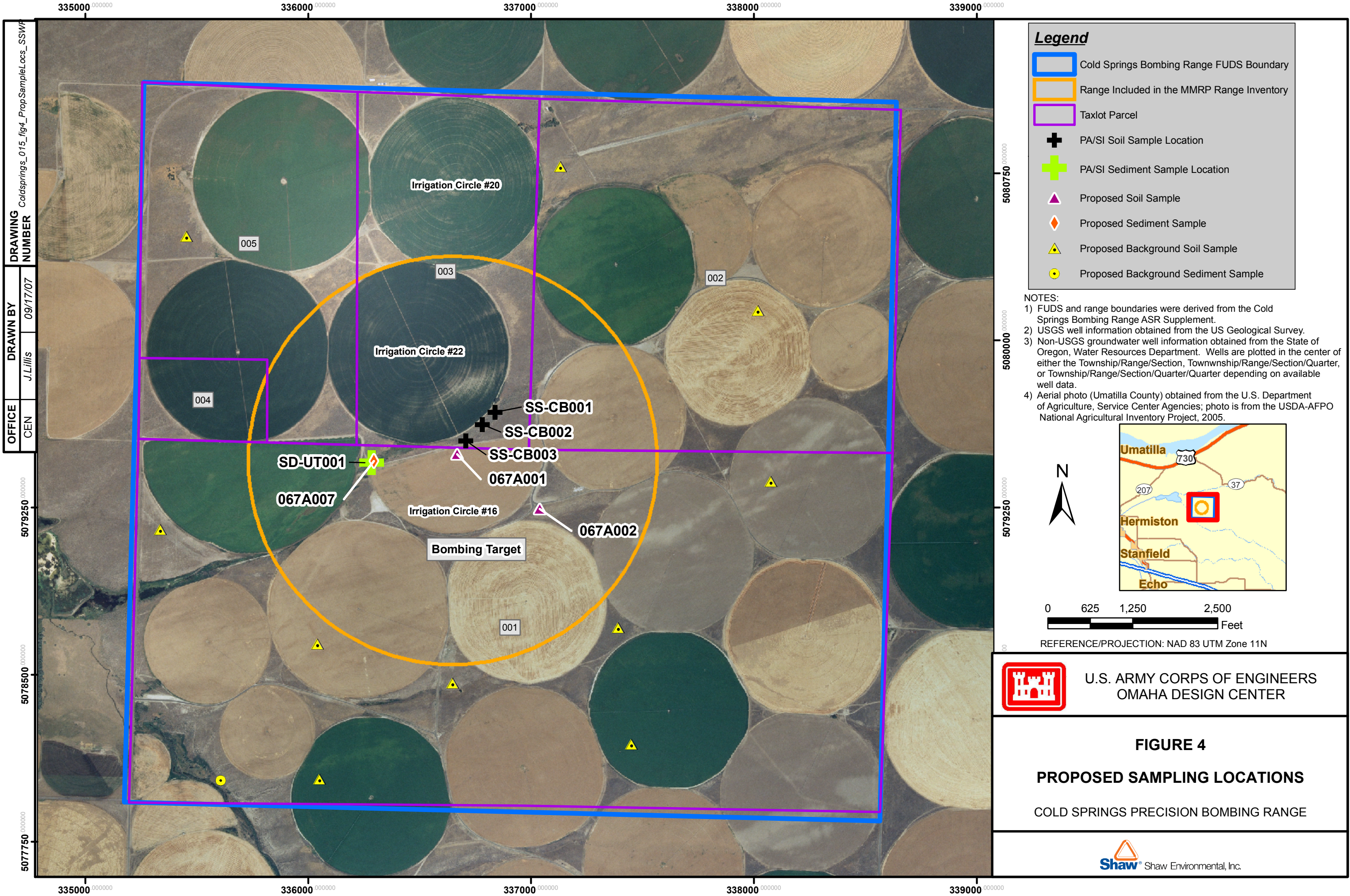


REFERENCE/PROJECTION: NAD 83 UTM Zone 11N



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FIGURE 3
PROPOSED
RECONNAISSANCE PATH
COLD SPRINGS PRECISION BOMBING RANGE



TABLES

Table 1
Munitions Information
Cold Springs Bombing Range

Area of Concern	Munitions	Munitions ID	Munitions Constituents
Bombing Range	100-pound practice bomb	M38A2 Practice Bomb	Sheet metal (chromium, copper, iron, lead, manganese, and nickel)
	Spotting Charge	M1A1	Black powder (potassium nitrate, sulfur, and charcoal)
	Spotting Charge	M3	Black smoke mixture, black powder (potassium nitrate, sulfur, and charcoal)
	Spotting Charge	M4	Feasibility study smoke
	37-mm Practice Projectile	M55A1 Practice Projectile	Steel (chromium, copper, iron, lead, manganese, and nickel)
	Fuze (for the 37-millimeter Practice Projectile)	M56	Tetryl, lead, aluminum

Note: The stakeholders agreed that explosive compounds are not expected based on the munitions used. Historical records indicate that M38A2 practice bombs were used at this range. Discovery of a 37-millimeter projectile was an anomaly since the range was not designed or used as a 37-millimeter site.

Table 2
Rights of Entry Status
Cold Springs Bombing Range

Landowner	Parcel ID	Map No.	Date ROE Prepared	Date Signed by Landowner	Well Access Needed	Estimated Date to Contact Prior to Field Work
Stahl Farm of Stanfield (Stahl Hutterian Brethren)	6103-133366	001	04/19/07	07/13/07	No	1 week prior
Stahl Farm of Stanfield (Stahl Hutterian Brethren)	6103-133364	002	04/19/07	07/13/07	No	1 week prior
Royale Columbia Farms, Inc.	6113-133360	003	04/19/07	09/18/07	No	1 week prior
Royale Columbia Farms, Inc.	6113-133363	004	04/19/07	09/18/07	No	1 week prior
Royale Columbia Farms, Inc.	6113-133361	005	04/19/07	09/18/07	No	1 week prior

Table 3
Sample Location Rationale
Cold Springs Bombing Range

AOC	Sample Location	Sample Media	Sample Location Rationale
Bombing Target	067A001	Surface Soil	Surface soil sample will be collected near the reported center of the bombing target and in the vicinity of the center pivot of irrigation circle #16 Sampling location to be determined in the field based on the visual identification of the AOC, the reconnaissance survey, and presence of MEC, munitions debris (MD), or other indicators of potentially impacted soils.
	067A002	Surface Soil	Surface soil sample will be collected in an area south of irrigation circle #16 in an area not impacted by irrigation and farming activities. Sampling location to be determined in the field based on the visual identification of the AOC, the reconnaissance survey, and presence of MEC, MD, or other indicators of potentially impacted soils.
	067A003 – 067A006	Surface Soil	A maximum of four contingent surface soil samples will be collected within the bombing target, with focus on irrigation circles #16 and #22 and the land between and surrounding them. The samples will be located in the field based on the results of the visual reconnaissance (Note: These samples are an addition and were not discussed in the Final TPP Memorandum). Sampling location to be determined in the field based on the visual identification of the AOC, the reconnaissance survey, and presence of MEC, MD, or other indicators of potentially impacted soils.
	067A007	Sediment	Sediment sample will be collected from a water collection area downgradient of the Bombing Target within a tributary of Despain Gulch. Sampling location to be determined in the field based on the visual identification of the AOC, the reconnaissance survey, and presence of MEC, MD, or other indicators of potential impact.
Background	067A008	Surface Soil	Ten background surface soil samples will be collected. Sampling locations will be determined in the field based on visual observation that the area does not appear to be impacted by past site operations. One background sediment sample will be collected from an area unknown to be impacted by past operations.
	067A009	Surface Soil	
	067A010	Surface Soil	
	067A011	Surface Soil	
	067A012	Surface Soil	
	067A013	Surface Soil	
	067A014	Surface Soil	
	067A015	Surface Soil	
	067A016	Surface Soil	
	067A017	Surface Soil	
	067A018	Sediment	

Table 4
Sample Designations, Quality Assurance/Quality Control, and Analyses
Cold Springs Bombing Range

AOC	Sample Location	Sample Type	Sample Number	Sample Media	Quality Assurance/Quality Control Samples		Analysis/EPA Method
					Field Duplicate	MS/MSD	
Bombing Target	067A001	Composite	NWO-067-0001	Soil	NWO-067-0007		Aluminum, chromium, copper, iron, lead, manganese, and nickel by SW-846 6020A
	067A002	Composite	NWO-067-0002	Soil			
	067A003	Composite	NWO-067-0003	Soil			
	067A004	Composite	NWO-067-0004	Soil			
	067A005	Composite	NWO-067-0005	Soil			
	067A006	Composite	NWO-067-0006	Soil			
	067A007	Composite	NWO-067-1001	Sediment			
Background	067A008	Composite	NWO-067-5001	Soil	NWO-067-5012		Aluminum, chromium, copper, iron, lead, manganese, and nickel by SW-846 6020A
	067A009	Composite	NWO-067-5002	Soil			
	067A010	Composite	NWO-067-5003	Soil			
	067A011	Composite	NWO-067-5004	Soil			
	067A012	Composite	NWO-067-5005	Soil			
	067A013	Composite	NWO-067-5006	Soil			
	067A014	Composite	NWO-067-5007	Soil			
	067A015	Composite	NWO-067-5008	Soil			
	067A016	Composite	NWO-067-5009	Soil			
	067A017	Composite	NWO-067-5010	Soil			
	067A018	Composite	NWO-067-5011	Sediment		NWO-067-5011-MS/MSD	

Table 5
Human Health Screening Criteria for Soil/Sediment at Oregon Sites^a
Cold Springs Bombing Range

Analyte	Abbreviation	CAS No.	Laboratory PQL (mg/kg)	Laboratory MDL (mg/kg)	EPA Region 6 Human Health MSSSLs		
					Residential MSSL ^b (mg/kg)	Industrial MSSL ^c (mg/kg)	SSLs ^d DAF=1 (mg/kg)
Metals/Inorganics							
Aluminum	Al	7429-90-5	100	2.7	76,000	100,000	
Chromium ^e	Cr	7440-47-3	2.0	0.28	210	500	2
Copper	Cu	7440-50-8	2.0	0.2	2,900	42,000	
Iron	Fe	7439-89-6	50	3.2	55,000	100,000	
Lead	Pb	7439-92-1	2.0	0.079	400	800	
Manganese	Mn	7439-96-5	2.0	0.057	3,200	35,000	
Nickel	Ni	7440-02-0	1.0	0.088	1,600	23,000	7

DAF = Dilution Attenuation Factor

EPA = Environmental Protection Agency

MDL = Method Detection Limit

mg/kg = milligrams per kilogram.

MSSSL = Medium-Specific Screening Levels

PQL = Practical Quantitation Limit

SSL = Soil Screening Level

Notes:

^a If laboratory cannot meet any of the preferred QLs with routine SW 846 methodology (as supported by MDLs that are no greater than 1/3 QL), laboratory's QL must be identified in laboratory submittal as failing to meet the QL. Some screening values cannot be obtained with routine methodology to the QL. In those cases, the QL achievable with a routine SW 846 methodology would be accepted.

^b MSSSLs from Region 6 MSSSL Table dated May 4, 2007 based on residential exposures to single chemical. The background information for these values is presented in *EPA Region 6 Human Health Medium-Specific Screening Levels* (December 2006).

^c MSSSLs from Region 6 MSSSL Table dated May 4, 2007 based on industrial outdoor worker exposures to single chemical. The background information for these values is presented in *EPA Region 6 Human Health Medium-Specific Screening Levels* (December 2006).

^d SSLs from Region 6 MSSSL Table dated May 4, 2007. These values have not been generated from the soil-screening calculations. The values have been copied from the August 1998 Region 6 MSSSL document and spot-checked using the latest EPA guidance (EPA, December 2006).

^e Total chromium values used.

Table 6
Selection of Soil Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)
Cold Springs Bombing Range

Parameter	ODEQ Level II Screening Level ^a Lowest Value for Plants/Inverts./ Birds/Mammals (mg/kg)	Proposed Benchmarks									Potential Biocumulative Constituent? ^h	Final Ecological Screening Value Soil ⁱ (mg/kg)	Laboratory PQL (mg/kg)
		EPA Region 5 ESLs (2003) ^b (mg/kg)	EPA Region 7 ^c (mg/kg)			EPA Region 8 ^d (mg/kg)		EPA Region 10 ^e (mg/kg)		Other Values: Talmage et al.(1999) ^f or LANL (2005) ^g (mg/kg)			
Metals/Inorganics													
Aluminum	50	NVA	50	EPA-R4	NVA		50	EPA-R4	5.5	LANL		50	100
Chromium (total)	0.4	0.4	26	SSL	26	SSL	26	SSL	2.3	LANL	Yes	0.4	2
Copper	50	5.4	60	ORNL	28	SSL	60	ORNL	10	LANL	Yes	50	2
Iron	10	NVA	200	EPA-R4	NVA		200	EPA-R4	NVA			10	50
Lead	16	0.0537	11	SSL	11	SSL	11	SSL	14	LANL	Yes	16	2
Manganese	100	NVA	100	EPA-R4	220	SSL	100	EPA-R4	50	LANL		100	2
Nickel	30	13.6	30	ORNL	38	SSL	30	ORNL	20	LANL	Yes	30	1

Table 6 (Cont.)
Selection of Soil Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Abbreviations and Acronyms:

Dutch – Dutch Intervention Values
 EPA – Environmental Protection Agency
 EPA-R4 – EPA Region 4
 LANL – Los Alamos National Laboratory
 mg/kg – milligrams per kilogram
 NVA: No value available
 ODEQ – Oregon Department of Environmental Quality
 ORNL – Oak Ridge National Laboratory Ecological PRGs (Efroymson et al)
 PQL – Practical Quantitation Limit
 SSL – EPA Eco Soil Screening Levels

Notes:

^a Oregon Department of Environmental Quality Screening Level Values (December 2001).

^b Ecological Screening Levels (ESLs), U.S. Environmental Protection Agency (EPA) Region 5, August 2003.

^c EPA Region 7: Catherine Wooster-Brown (Eco Risk Assessor) recommends the following hierarchy: EPA EcoSSLs; ORNL Efroymson values; EPA Region 4 values; other published values.

^d EPA Region 8: Dale Hoff (Eco Risk Assessor) recommends the following hierarchy: EPA SSLs; Dutch Intervention Values or ORNL Efroymson values.

^e EPA Region 10: Joseph Goulet (Eco Risk Assessor) says Region 10 has no recommended hierarchy; therefore, values from the EPA Region 7 Approach were used.

^f Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel, 1999, Nitroaromatic Munitions Compounds: Environmental Effects and Screening Values, **‘Revisions Environmental Contaminant Toxicology.’**

^g Los Alamos National Laboratory (LANL), Eco Risk Database, Release 2.2, September 2005.

^h Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation. Potential bioaccumulative potential from: Bioaccumulation and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs (EPA, 2000) and ODEQ EQSLVs (ODEQ, 2001).

ⁱ Final Screening Value selected using the following hierarchy:

1. State Value (Oregon)
2. EPA Region State Located In (EPA Region 10)
3. Lower of Talmage et al. (1999) or LANL (2005) values.

Other References:

[U.S. Environmental Protection Agency, 2005, Guidance for Developing Ecological Soil Screening Levels \(Eco-SSLs\), Office of Solid Waste and Emergency Response, website version last updated August, 2007: http://www.epa.gov/ecotox/ecossl.](http://www.epa.gov/ecotox/ecossl)

U.S. Environmental Protection Agency, 2001, Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Originally published November 1995.

[Website version last updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecolbul.htm.](http://www.epa.gov/region4/waste/ots/ecolbul.htm)

Efroymson, R.A., Suter II, G.W., Sample, B.E. and Jones, D.S., 1997. Preliminary Remediation Goals for Ecological Endpoints. Lockheed Martin Energy Systems, Inc. (ORNL) ES/ER/TM-162/R2.

Dutch Intervention Values:

Swartjes, F.A. 1999. Risk-based Assessment of Soil and Groundwater Quality in the Netherlands: Standards and Remediation Urgency. Risk Analysis 19(6): 1235-1249

[The Netherlands Ministry of Housing, Spatial Planning and Environment’s Circular on target values and intervention values for soil remediation](http://www2.minvrom.nl/Docs/internationaal/S_12000.pdf)
http://www2.minvrom.nl/Docs/internationaal/S_12000.pdf and Annex A: Target Values, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination

Table 7
Selection of Ecological Sediment Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)
Cold Springs Bombing Range

Parameter	ODEQ Screening Level Values ^a (mg/kg) Freshwater	EPA Region 5 ESLs ^b (mg/kg)	EPA Region 7 ^c (mg/kg)		EPA Region 8 ^d (mg/kg)		EPA Region 10 ^e (mg/kg)		Other Values: Talmage et al. (1999) ^f or LANL (2005) ^g (mg/kg)		Potential Bioaccumulative Constituent? ^g	Final Ecological Screening Value Sediment ^h (mg/kg)	Laboratory PQL (mg/kg)
Metals/Inorganics													
Aluminum	NVA	NVA	NVA		NVA		NVA		2.80E+02	LANL		2.80E+02	20.0
Chromium	3.70E+01	4.34E+01	4.34E+01	MAC	4.34E+01	MAC	4.34E+01	MAC	5.60E+01	LANL	Yes	3.70E+01	1.0
Copper	1.00E+01	3.16E+01	3.16E+01	MAC	3.16E+01	MAC	3.16E+01	MAC	1.70E+01	LANL	Yes	1.00E+01	1.0
Iron	NVA	NVA	NVA		NVA		NVA		2.00E+01	LANL		2.00E+01	15.0
Lead	3.50E+01	3.58E+01	3.58E+01	MAC	3.58E+01	MAC	3.58E+01	MAC	2.70E+01	LANL	Yes	3.50E+01	1.0
Manganese	1.10E+03	NVA	NVA		NVA		NVA		7.20E+02	LANL		1.10E+03	0.5
Nickel	1.80E+01	2.27E+01	2.27E+01	MAC	2.27E+01	MAC	2.27E+01	MAC	3.90E+01	LANL	Yes	1.80E+01	1.0

Table 7 (Cont.)
Selection of Ecological Sediment Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Abbreviations and Acronyms:

EPA – Environmental Protection Agency
 EPRGs – Oak Ridge National Laboratory Ecological PRGs
 ISQGs – Canadian Interim Sediment Quality Guidelines
 LANL – Los Alamos National Laboratory
 MAC – MacDonald Consensus Values
 mg/kg – milligrams per kilogram
 NVA – No Value Available
 TAL – Talmage et al (1999)
 PQL – Practical Quantitation Limit

^a Oregon Department of Environmental Quality Screening Level Values (December 2001).

^b Ecological Screening Levels (ESLs), USEPA Region 5, August 2003.

^c EPA Region 7: Catherine Wooster-Brown (Eco Risk Assessor) recommends the following hierarchy: MacDonald Consensus Values (MacDonald, 2000); ORNL Efroymsen values (ORNL, 1977).

^d EPA Region 8: Dale Hoff (Eco Risk Assessor) recommends the following hierarchy: MacDonald Consensus Values (MacDonald, 2000); Canadian ISQG values (CCME, 2003) or ORNL Efroymsen values (ORNL, 1977).

^e EPA Region 10: Joseph Goulet (Eco Risk Assessor) says Region 10 has no recommended hierarchy; therefore, values from the EPA Region 7 Approach were used.

^f Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel (TAL), 1999, Nitroaromatic Munitions Compounds: Environmental Effects and Screening Values, Revisions Environmental Contaminant Toxicology.’

^g Los Alamos National Laboratory (LANL), Eco Risk Database, Release 2.2, September 2005.

^h Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation. Potential bioaccumulative potential from: Bioaccumulation and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs (EPA, 2000) and ODEQ EQSLVs (ODEQ, 2001).

ⁱ Final Screening Value selected using the following hierarchy:

1. State Value (Oregon)
2. EPA Region State Located In (EPA Region 10)
3. Lower of Talmage et al. [TAL] (1999) or LANL (2005) values.

Note: The Talmage [TAL] screening values assume 10% organic carbon in the sediment.

Other References:

Efroymsen, R.A., et al., 1997, Preliminary Remediation Goals (EPRGs), ORNL, ES/ER/TM-162/R2.

Canadian Interim Sediment Quality Guidelines (ISQGs) Summary Table, CCME, December 2003.

MacDonald, D.D, C.G. Ingersoll and T.A. Berger, 2000, Development and Evaluation of Consensus-Based Sediment Quality Criteria for Freshwater Ecosystems, Archives of Environmental Contamination and Toxicology 39:20-31.

APPENDIX A
CONCEPTUAL SITE MODEL

Conceptual Site Model – Bombing Target

Overview

A site-specific CSM summarizes available site information and identifies relationships between exposure pathways and associated receptors. A CSM is used to determine the data types necessary to describe site conditions and quantify receptor exposure, and discusses the following information:

- Current site conditions and future land use.
- Potential contaminant sources (e.g., metals and explosives from bombs).
- Affected media.
- Governing fate and transport processes (e.g., surface water runoff and/or groundwater migration).
- Exposure media (i.e., media through which receptors could contact site-related contamination).
- Routes of exposure (e.g., inhalation, incidental ingestion, and dermal contact).
- Potential human and/or representative ecological receptors at the exposure point. Receptors likely to be exposed to site contaminants are identified based on current and expected future land uses.

The CSM is evaluated for completeness and further developed as needed through TPP meetings and additional investigation.

Background

The CSM is based on information presented in the ASR (USACE, 1997) and ASR Supplement (USACE, 2004). The ASR references a 1949 photograph that presents a description of the bombing target as follows:

“A large and very distinct bulls-eye target with three rings. Radiating out from the middle ring are four straight lines, at 90 degree angles to each other. There are two tick marks on each line; these are marked at equal distances along the straight line. Outside of the circles and in the north east quadrant is a marking of an Arabic number 4. There are black dots in the area; these appear to be wells. Some are within the circles and some are just outside the circles. There do not seem to be any craters in the vicinity of the site. About 1,250 ft south of the bull’s eye target is a very small squatty target or marker. It has an elliptical outer ring with a white center. The elliptical shape is oriented in an east-west direction. From the center are two lines, ninety degrees to each other and radiating to the outer circle.”

Figure 3 of the Final TPP Memorandum (Shaw, 2007) presents a layout of the bombing target.

History of Use

- Precision bombing range for night and day training missions.

- Army erected a three-tower target in 1942.
- Historical records indicate the range was used for M38A2 practice bombs (however, a 37-mm live artillery round was unearthed by a landowner).
- Figure 7 of the Final TPP Memorandum (Shaw, 2007) illustrates the conceptual site model for the Bombing Target at the Cold Springs Precision Bombing Range.

Munitions and Associated MC

Area of Concern	Munitions	Munitions Constituents
Bombing Range	Practice Bomb, 100-pound (M38A2)	Sheet metal (chromium, iron, copper, lead, manganese, and nickel)
	Spotting Charge (M1A1)	Black powder (potassium nitrate, sulfur, and charcoal)
	Spotting Charge (M3)	Black smoke mixture, black powder (potassium nitrate, sulfur, and charcoal)
	Spotting Charge (M4)	FS smoke
	37-mm Practice Projectile (M55A1)	Steel (chromium, iron, copper, lead, manganese, and nickel)
	Fuze for 37-mm Practice Projectile (M56)	Tetryl, lead, aluminum

Note: The stakeholders agreed that explosive compounds are not expected based on the munitions used. Historical records indicate that M38A2 practice bombs were used at this range. Discovery of a 37-millimeter projectile was an anomaly since the range was not designed or used as a 37-millimeter site.

Previous MEC Finds

- A 37-mm point detonating artillery round was unearthed by a landowner in 1975. However, the ASR (USACE, 1997) indicates that this was likely an isolated occurrence since the site was exclusively used for bombing activities.

Previous MC Sample Results

- A field sampling investigation of the Cold Springs Precision Bombing Range was conducted by Weston in December 2004. A draft PA/SI Report was issued to the EPA – Region 10 on April 25, 2005, presenting the results of the December sampling effort (Weston, 2005).
- All source samples were analyzed for inorganics, perchlorate, and NBECs.
 - Laboratory results indicated arsenic, barium, chromium, cobalt, copper, lead, manganese, nickel, silver, vanadium, and zinc are present above their sample quantitation limit (SQL).
 - NBECs were not detected above SQLs and perchlorate was detected at 0.83 milligrams per kilogram at one source sample location (collected of surface soil at the center of the Bombing Target).

- Groundwater samples were collected from five domestic wells and analyzed for inorganics, perchlorate, and NBECs. None of the wells are located within the Bombing Target area of concern. However, two of the five wells are located within the 4-mile target distance limit.
 - Laboratory results indicated barium, chromium, copper, manganese, vanadium, and zinc are present above their SQLs.
 - Perchlorate (by EPA Method 8321A-modified) was detected in three samples ranging from 0.25 to 1.2 µg/L, which is below the DoD action level of 24 parts per billion. Perchlorate (by EPA Method 314.0) was nondetect for all five samples.
 - NBECs were not detected above SQLs.
- Sediment target samples were analyzed for inorganics, perchlorate, and NBECs.
 - Inorganics were present above their respective SQLs.
 - Perchlorate and NBECs were not detected above SQLs.
- Surface water samples were analyzed for inorganics, perchlorate, NBECs, pesticides, and PCBs.
 - Inorganics were present above their respective SQLs.
 - Perchlorate (by EPA Method 314.0) was detected in two of seven surface water samples at 3.63J and 12.0 µg/L. Perchlorate (by EPA Method 8321A-modified) was detected in all seven samples, ranging from 0.035 to 1.1 µg/L.
 - NBECs and pesticides/PCBs were not detected above SQLs.
- One background soil sample (SS-BK001) was collected north of Cold Springs and one co-located set of sediment (SD-BK001) and surface water (SW-BK001) samples were collected from Cold Springs on Royal Columbia Farms property (PA/SI Summary, Figure 3-2) (Weston, 2005). The soil sample was analyzed for target analyte list metals, NBECs, and perchlorate (Method 314.0). The sediment and surface water samples were analyzed for metals, pesticides/PCBs, perchlorate Method 314.0 for sediment and surface water), and NBECs. Additionally, the surface water sample was also analyzed for perchlorate by Method 8321A-modified. Perchlorate was detected in the background sediment sample from Method 314.0 (7.68 µg/L) and Method 8321A-modified (7.6 µg/L).
- Based on the human health and ecological targets identified in the PA/SI (Weston, 2005), it was determined that the groundwater, surface water, and soil pathways were the only potentially significant pathways associated with the site. Due to the limited number of soil concentrations above background values, it is unlikely that the air migration pathway would significantly contribute to the site HRS score.
- A separate PA/SI was conducted by Weston (2005) concurrently for the North Morrow Perchlorate Study Area (Weston, 2005b). Both PA/SI documents share some of the same concerns, including the potential presence of perchlorate in groundwater and surface water.

Current and Future Land Use

- Site is privately owned.
- Currently the site is mainly being used for irrigated farming, this should continue into the future.

Ecological Receptors

- This FUDS does qualify as an Important Ecological Place (IEP) because the habitat is known to be used by state and/or federal designated or proposed designated endangered or threatened species.
- Cold Springs Reservoir is a warm water sports fishery and a National Wildlife Refuge. The reservoir includes several species of sport fish and is used by migratory birds.

MEC Evaluation

- Only documented use was from 1942 to 1946 as a practice bombing range using M38A2 100-lb practice bombs with spotting charges.
- The M38A2 practice bomb is a sand-filled or flour-filled bomb.
- The spotting charge contained black powder or a smoke mixture.
- Historical evidence indicates munitions debris litters the site. No MEC from the practice bombs.
- A practice 37-mm practice projectile with a nonstandard point detonating sensitive fuze was found by a landowner approximately 1975. No other MEC or munitions debris associated with the 37-mm has been reported.
- The site is currently privately owned and is used for irrigated farming and occasionally for livestock grazing.
- There is restricted access to the site, since it is privately owned.
- The population density is less than 100 people per square mile.
- There are approximately 25 occupied buildings within a 2-mile radius of the site.

MEC Evaluation/Investigation Needed

- Visual field reconnaissance of the target area and irrigation circle #20 (where the projectile was discovered) will be conducted by a qualified unexploded ordnance (UXO) technician with the aid of a hand-held magnetometer.

MC Evaluation

- Munitions debris (i.e., 100-lb practice bombs with spotting charge) in the site soils.
- One 37-mm point detonating artillery round was found by a landowner in approximately 1975. This item does not fit with the CSM and may have been an isolated occurrence of something dropped from an airplane.
- Figure 7 of the Final TPP Memorandum (Shaw, 2007) illustrates the CSM for the Bombing Target and potential pathways of MC contamination.
- The site is currently privately owned and is used for irrigated farming and livestock grazing.
- There is restricted access to the site.
- The population density is less than 100 people per square mile.
- There are less approximately 25 occupied buildings within a 2-mile radius of the site.

Overview of Pathways

Affected media and potential pathways for MC include:

- Soil - Soil is the primary medium of concern due to the presence of munitions debris (i.e., 100-lb practice bombs with spotting charges) and possibly MC in the soil resulting from the discharge of munitions into the bombing range. The soil also serves as a secondary source of air contamination.
- Sediment - Sediment may be potentially affected by surface water runoff from impacted soil areas.
- Surface Water - The Cold Springs Bombing Range is drained by Despain Gulch and several small tributaries. Surface runoff to water bodies within the AOC is considered a complete pathway. Water and sediment within the water body provide potential exposure to MC. Surface water presents a possible completed pathway between MC and receptor. By agreement of the TPP team, one sediment sample will be collected to evaluate the surface water/sediment pathway.
- Groundwater - According to the ASR (USACE, 1997), groundwater at the site is not easily obtained. During the PA/SI (Weston, 2005) five groundwater wells were sampled. Three of the five wells detected perchlorate ranging from 0.25 µg/L to 1.2 µg/L. However, only two of the five wells are located within the 4-mile radius of the target area. Of those two wells, only one well detected perchlorate (0.30 µg/L) below the DoD action level of 24 µg/L. Additionally, the well is screened from 375 to 720 ft below ground surface. Groundwater presents a possible completed pathway between MC and receptor, but is not a realistic pathway due to the depth of the groundwater.
- Air - Air is a possible completed pathway through inhalation of contaminated soil particles. The prevailing wind direction is from the southeast. Blowing dust from the target could mobilize soil particles. The pathway is considered to be complete.
- An analysis of exposure pathways and receptors for MEC is provided in Table 3 of the Final TPP Memorandum (Shaw, 2007), "MEC and MC Exposure Pathway Analysis."

Terrestrial Pathway

Sources of MC

- The PA/SI (Weston, 2005) samples detected metals above background concentrations.
- MC from the spotting charges could include black powder, black smoke mixture, and FS smoke. MC from the 37-mm projectile fuze could include aluminum, lead, and Teteryl. Metals from bomb bodies (chromium, iron, copper, lead, manganese, and nickel).
- The ASR indicates that aerial photography shows the bombing target located near irrigation tract #16 (USACE, 1997). This is a hill, which drops off into a small canyon on the north, south, and west sides.
- The greatest concentration of practice bomb remnants was found in the vicinity of irrigation tracts #16 and #22.
- The 37-mm artillery round was located in an area believed to be irrigation tract #20.

Migration Pathway

- Wildlife in the area potentially may be exposed to MC through soil, sediment, and water pathways.
- Humans may come in contact with MC contamination through intrusive and nonintrusive work and recreational activities in areas where munitions debris may be present.

Land Use and Access

- Current land use is for irrigated farming and occasional livestock grazing, it is assumed this use will remain the same in the future
- The land is privately owned
- Access to the site is restricted

Human Receptors

- The most likely current and future human receptors at the site would be the landowners and any workers.

Ecological Assessment

- Site has been determined to be an IEP based on potential for threatened and endangered (T&E) to use the property.
- The potential T&E species are listed in Section 2.4.3.
- The pathway for ecological receptors is complete.

Surface Water/Sediment Pathway

- The Cold Springs Bombing Range is drained by intermittent drainage in Despain Gulch and several small tributaries. Surface runoff drainages within the AOC are considered a complete pathway. Sediment within the water body provides potential exposure to MC. Surface water and sediment present possible completed pathways between MC and receptor.

Sources of MC

- Metals (chromium, iron, copper, lead, manganese, and nickel). The PA/SI (Weston, 2005) samples detected metals in sediment above background concentrations.

Migration Pathway

- Despain Gulch drains to Cold Springs Reservoir.

Surface Water Use and Access

- Irrigation.

Human Receptors

- Workers.

Ecological Assessment

- According to the ASR (USACE, 1997), one bird and two fish federal T&E species may be present in the vicinity of the site; one state T&E species may be in the vicinity of the site; and seven candidate federal T&E species may be present in the vicinity of the site.

Groundwater Pathway

According to the PA/SI (Weston, 2005), five wells were sampled during the investigation. The groundwater sample design was based on the spatial relationship of the wells to the FUDS.

There were no wells within the FUDS boundary. The shallow alluvial aquifer was targeted for sampling. The following wells were sampled:

- Sample GW-DW001 – Rameriz well 9.4 miles west of FUDS – (67 ft deep);
- Sample GW-DW002 – Messenger well 4.6 miles west of FUDS – (60 ft deep);
- Sample GW-DW003 – Stahl Hutterian well 3.3 miles S-SE of FUDS – (720 ft deep);
- Sample GW-DW004 – Hat Rock State Park 5.2 miles NW of FUDS – (17 ft deep); and
- Sample GW-DW005 – Schmittle well 4.2 miles NW of FUDS – (104 ft deep).

Based on the well log information presented in the PA/SI, it appears that all the wells were completed in the open-hole without well screens. All of the wells, except the Stahl Hutterian well, have static water levels consistent with and are completed within the alluvial aquifer. Of the five wells sampled, only three of the wells detected perchlorate ranging from 0.25 µg/L to 1.2 µg/L, which is below the DoD action level of 24 µg/L. Also one of the perchlorate detections (0.30 µg/L) was from the Stahl Hutterian well which has a static water level of 419 ft which is well below the shallow alluvial aquifer. The analytical results presented in the PA/SI are sufficient for use in this SI evaluation. Therefore, it is not recommended that another shallow groundwater sample be collected.

Air Pathway

- Air is a possible completed pathway through inhalation of contaminated soil particles. The prevailing wind direction is from the southeast. Exposure to the air pathway is considered in the human health screening values and is not assessed further here.

MC Evaluation/Investigation Needed

- One surface soil sample is planned from near the center of the bombing target in an area with a high concentration of practice bomb fragments (near irrigation circles #16 and #22). The sample would be analyzed for select metals (aluminum, chromium, iron, copper, lead, manganese, and nickel). The list is based on the expected metals from the munitions (bomb casing and fuze). Only black powder explosives were known to be used. During the TPP meeting it was recommended, and agreed by the ODEQ, that the samples be analyzed for metals and explosives. However, after reviewing the results of the PA/SI (Weston, 2005), which analyzed samples for NBECs and the fact that explosives were not used at the site, it is being recommended in this TPP Memorandum that samples not be analyzed for explosives.

- One surface soil sample will be collected outside the center of the bombing target area but within the FUDS in an area between crop circles, which have not been impacted by irrigation. The sample would be analyzed for select metals (aluminum, chromium, iron, copper, lead, manganese, and nickel) only
- One sediment sample will be collected in an area within and downgradient of the Bombing Target. The sample would be analyzed for select metals (aluminum, chromium, iron, copper, lead, manganese, and nickel).
- Ten background soil and one background sediment sample will also be collected. The samples would be analyzed for TAL metals.
- No surface water or groundwater samples will be collected from the Cold Springs Precision Bombing Range.
- No air samples will be collected from the Cold Springs Precision Bombing Range. Analytical results from soil samples can be used in the evaluation of the air pathway.

CSM Summary/Data Gaps

- The only indication of MEC was of a 37-mm practice projectile with a nonstandard point detonating sensitive fuze that was found near irrigation circle #20 by a landowner. However, this does not fit the site CSM and the ASR (USACE, 1997) indicates the occurrence to be an abnormality since the site was only used for bombing activities.
- MC from the spotting charges could include black powder, black smoke mixture, and FS smoke. Metals from bomb bodies could include chromium, iron, copper, lead, manganese, and nickel.
- Some sampling for MC has been completed as part of the PA/SI (Weston, 2005). Perchlorate was detected in surface water and groundwater. Perchlorate was detected in one surface soil sample also. However, perchlorate has not been identified as MC in the munitions used at the FUDS. Results of the current status of data requirements with respect to MEC and MC for the Bombing Target located at the former Cold Springs Precision Bombing Range are summarized below.

Pathway	Presence of MEC	Presence of MC	Proposed Inspection Activities
Soil	<p>Yes, 37-mm projectile discovered near irrigation circle #20; however, the ASR (USACE, 1997) indicates that this is not the result of site-related activities.</p> <p>A high density of practice bomb debris has been found at irrigation circles #16, #20, and #22, and in the gulch between irrigation circles #16 and #22.</p>	None. Surface and subsurface soil samples were collected during the PA/SI (Weston, 2005).	Visual reconnaissance and surface soil sampling.

Pathway	Presence of MEC	Presence of MC	Proposed Inspection Activities
Sediment	None	None. Sediment samples were collected during the PA/SI (Weston, 2005).	Sediment sampling.
Surface water	None	None. Surface water samples were collected during the PA/SI (Weston, 2005).	No sampling.
Groundwater	None	None. Groundwater samples were collected from domestic wells during the PA/SI (Weston, 2005).	No sampling.
Air	None	None	Included in evaluation of soil pathway.

Analytical data gathered during the PA/SI may (Weston, 2005) may not fully meet the DQOs of the current SI (i.e., the analytical methodology, analyte list, and detection limits may, or may not, conform to the USACE Programmatic Sampling and Analysis Plan (SAP) (Shaw, 2006).

Therefore, those analytical results previously collected are not interpreted with the sole purpose of making a determination that no further investigation is required. However, the previously collected data can be used reasonably to make a recommendation for no further action.

APPENDIX B
USACE INTERIM GUIDANCE DOCUMENT 06-05
AND
SAFETY ADVISORY 06-2



DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF:

MAR 16 2006

CEHNC-OE-CX

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Procedure for Preliminary Assessment (PA) and Site Inspection (SI) Teams that Encounter Unexploded Ordnance (UXO) While Gathering Non-UXO Field Data, Military Munitions Center of Expertise (MM CX) Interim Guidance Document (IGD) 06-05

1. PURPOSE: This procedure describes the responsibilities of project teams during the preliminary assessment and site investigation phases should unexploded ordnance (UXO) be discovered.
2. APPLICABILITY: This guidance is applicable to the geographic military Districts, Military Munitions Response Program (MMRP) Design Centers, Major Subordinate Commands (MSCs), and designated Remedial Action Districts performing MMRP response actions.

3. REQUIREMENTS AND PROCEDURES:

a. During site visits to formerly used defense site (FUDS) properties to gather PA or SI information, in the rare instance that a UXO-qualified individual identifies an item that is an explosive hazard, the following actions will occur:

(1) The property owner or individual granting rights of entry to the property will be notified of the hazard and advised to call the local emergency response authority (i.e., police, sheriff, or fire department). The individual will also be informed that if they do not call the local response authority within 1 hour, the individual who identified the UXO item will notify the local emergency response authority.

(2) The local response authority will decide how to respond to the reported incident, including deciding not to respond (e.g., if the local response authority is already aware of the hazards on the property). If the local response authority decides to respond, the individual who identified the item or his designee will mark the location of the item and provide accurate location information to the emergency response authority. The individual who identified the item or his designee will generally remain in the area until the local response authority arrives, unless specifically indicated by the appropriate response authority that the individual may leave the area.

(3) During the SI, the state regulator may also be notified at their request.

MAR 16 2006

CEHNC-OE-CX

SUBJECT: Procedure for Preliminary Assessment (PA) and Site Inspection (SI) Teams that Encounter Unexploded Ordnance (UXO) While Gathering Non-UXO Field Data, Military Munitions Center of Expertise (MM CX) Interim Guidance Document (IGD) 06-05

b. During site visits to active installations or Base Realignment and Closure (BRAC) sites to gather PA or SI information, in the rare instance that a UXO-qualified individual identifies an item that is an explosive hazard, the following actions will occur:

(1) The installation point of contact (POC) or the BRAC coordinator will be notified of the hazard and requested to notify explosive ordnance disposal (EOD) through their channels.

(2) The installation/EOD will make the determination if they are going to respond to the incident. The installation/EOD may be aware of the hazards at the site and make the decision not to respond. If the installation/EOD decides to respond, the individual who identified the item or his designee will mark the location and provide accurate location information to the installation/EOD unit and will remain in the area unless the installation/EOD unit requests otherwise.

c. Neither the US Army Corps of Engineers personnel, nor their contractors have the authority to call EOD to respond to an explosive hazard. This call is the responsibility of the local emergency response authority for FUDS properties and it must come through the proper chain of command on installations.

d. AR 75-14 and AR 75-15 contain the information on how EOD responds to explosives hazards.

4. EFFECTIVE DATES: The requirements and procedures set forth in this interim guidance are effective immediately. They will remain in effect indefinitely, unless superseded by other policy or regulation.

5. POINT OF CONTACT: If you need additional information, please contact Mr. Brad McCowan at 256-895-1174.



CAROL A. YOUKEY, P.E.
Chief, Center of Expertise for Ordnance
and Explosives Directorate



DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301
May 23, 2006

REPLY TO
ATTENTION OF:

OE Safety Division for Ordnance
and Explosives Directorate

Shaw Environmental
4171 Essen Lane
Baton Rouge, Louisiana 70809

Dear Sir/Madam:

This is Safety Advisory 06-2 – Munitions and Explosives of Concern (MEC) Safety During Site Inspections (SI), Pre-Work Plan Visits, Archive Search Reports (ASR) Investigations and Other Site Visits of a Non-Intrusive Nature.

Reference EP 75-1-1, EP 385-1-95a, and Interim Guidance Document (IGD), March 15, 2006.

The following procedures will be followed if an item is found that has an explosive hazard during the activities identified in the subject line:

- a. MEC items are not to be moved or disturbed during the above subject SI, Pre-Work Plan visits, ASR Investigations and other site visits of a non-intrusive nature.
- b. The locations of any discovered explosive hazardous items should be marked for accurate relocating purposes and the information provided to the designated Point of Contact (POC) and any emergency response authorities as may be required.
- c. During site visits to active Installations and/or Base Realignment and Closure (BRAC) sites the identified Installation POC or the BRAC coordinator should be notified of discovered MEC hazards. They then will request any appropriate emergency response action as deemed necessary through their channels if required.
- d. When a site visit is on a Formerly Utilized Defense Site, the property owner shall be notified in the event of finding any found explosive hazards along with the location of the explosive item(s) found, the property owner should then in turn notify their local emergency response authorities.

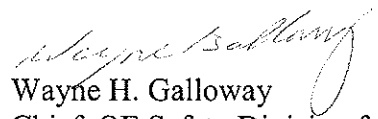
e. During these site visits all required MEC security requirements should be implemented as necessary and required. All team members are to be instructed in and made aware of any MEC security requirements.

f. All team members will be briefed on these procedures prior to any site investigations being performed and daily before any work begins.

This Safety Advisory is intended to serve as an explosives safety reminder.

Comments or questions about this Safety Advisory can be directed to the undersigned at (256) 895-1598/82.


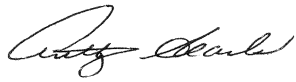



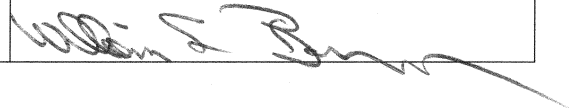
Sincerely,

A handwritten signature in cursive script, appearing to read "Wayne H. Galloway", is written over the printed name.

Wayne H. Galloway
Chief, OE Safety Division for
Ordnance and Explosives Directorate

APPENDIX C

SITE SAFETY AND HEALTH PLAN ADDENDUM

ADDENDUM <u>OR-6</u> TO SITE SAFETY AND HEALTH PLAN (SSHP) REVIEWS AND APPROVAL US Army Corps of Engineers, Omaha District		This SSHP is a part of the Omaha District Safety Program. Please read and comply with USACE EM 385-1-1 and CENWO OM 385-1-1.
Reviewer	Date	Signatures
Authored by: Pamela Moore	9/17/07	Signature: 
Peer Review by: Anthony Searls	9/17/07	Signature: 
Quality Control Review (QCR) by: Paul Sadowski	11/12/07	Signature: 
Project Manager Reviewed by: Dale Landon for Peter Kelsall	9/17/07	Signature: 
USACE Omaha District MM DC OE Safety Specialist Review: Andrew G. Marks	11/14/07	Signature: 
USACE Omaha District MM DC Project Manager Approval: John Miller	11/14/07	Signature: 

ADDENDUM <u>OR-6</u> TO SITE SAFETY AND HEALTH PLAN (SSHP) TITLE PAGE US Army Corps of Engineers, Omaha District	This SSHP is a part of the Omaha District Safety Program. Please read and comply with USACE EM 385-1-1 and CENWO OM 385-1-1.
PROJECT NAME: FUDS SI – Cold Springs Bombing Range	
PURPOSE OF ADDENDUM: This Addendum provides details specific to activities at this FUDS that were not provided in the approved Accident Prevention Plan and Site Safety and Health Plan included in the <i>Final Type I Work Plan, Site Inspections at Multiple Sites, NWO Region</i> (Shaw, 2006).	
DESCRIBE THE CHANGES EFFECTED BY THIS ADDENDUM: Add site-specific supplemental information.	

SITE SAFETY AND HEALTH PLAN ADDENDUM

Site Name:	Cold Springs Bombing Range
Site Location:	The former Cold Springs Precision Bombing Range or Cold Springs Bombing Range is located approximately 9 miles east of the city of Hermiston in Umatilla County, Oregon. The area of concern is the Bombing Target.
Purpose of Visit:	Site Inspection to conduct site reconnaissance for munitions of explosive concern (MEC) and collect surface soil and sediment samples to evaluate the presence of metals.
Date(s) of Site Visit:	December 2007
Office:	Shaw Environmental, Inc., Richland, Washington office
Address:	1045 Jadwin Avenue, Suite C Richland, WA 99352
Telephone:	Commercial: (509) 943-6728

Date Prepared: September 17, 2007

Updated: November 15, 2007

Site inspection work at this FUDS will be conducted in accordance with the approved Accident Prevention Plan and Site Safety and Health Plan (SSHP) included in the *Final Type I Work Plan, Site Inspections at Multiple Sites, NWO Region* (Shaw, 2006). This Addendum provides details specific to activities at this FUDS that were not provided in the SSHP.

I. SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS:

(A site map is provided in the Site-Specific Work Plan.)

A. SITE DESCRIPTION:

- Size: The ASR (USACE, 1997) indicates that the entire area of the Cold Springs Precision Bombing Range FUDS is approximately 2,622.08 acres, while the ASR Supplement (USACE, 2004) indicates the area of the Bombing Target is 649 acres. The range area is a circle with a radius of 3,000 feet, the standard configuration for a practice bombing range.
- Present Usage (Check all that apply)

<input type="checkbox"/> Military	<input type="checkbox"/> Recreational	<input checked="" type="checkbox"/> Agricultural
<input type="checkbox"/> Residential	<input type="checkbox"/> Commercial	<input type="checkbox"/> Landfill
<input type="checkbox"/> Natural Area	<input type="checkbox"/> Industrial	
<input type="checkbox"/> Other Specify		

<input checked="" type="checkbox"/> Secured	<input checked="" type="checkbox"/> Active	<input type="checkbox"/> Unknown
<input checked="" type="checkbox"/> Unsecured	<input type="checkbox"/> Inactive	

B. PAST USES:

The ASR Supplement (USACE, 2004) indicates the area of the Bombing Target is 649 acres. The range area is a circle with a radius of 3,000 feet, the standard configuration for a practice bombing range. The site was used by several assigned military units for day and night training missions, including a squadron (the B-24 Bomber and the C-45 Cargo Aircraft) stationed at the Walla Walla Army Air Field. Three plotting and spotting towers, a pump house, and well were the only improvements to the site. From 1942 to 1946, the site was used as a practice bombing range using only M38A2 100-pound (lb) practice bombs filled with sand or flour. In 1975, one landowner dug up a 37-millimeter (mm) point detonating artillery round. The ASR (USACE, 1997) suggests that it is not related to site activities. The range was not designed nor used as a 37-mm site.

C. SURROUNDING POPULATION:

<input checked="" type="checkbox"/> Rural	<input type="checkbox"/> Residential	<input type="checkbox"/> Commercial
<input type="checkbox"/> Urban	<input type="checkbox"/> Industrial	
<input type="checkbox"/> Other Specify		

D. PREVIOUS SAMPLING/INVESTIGATION RESULTS:

On May 17, 1995, personnel from the USACE St. Louis District conducted a site visit. The team met with Mr. John Walchli, a long-time resident and lessee (USACE, 1995a). Mr. Walchli informed the team of numerous discoveries of practice bomb remnants he made, and that he buried a large quantity of that material in the eastern portion of

irrigation circle #22. Additionally, he showed the site inspection team a live 37-mm, point detonating artillery round, which he unearthed in approximately 1975 from what is believed to be irrigation circle #20. Markings indicated it was a M55A1 practice round; however, it had a M56 fuze (which is highly explosive and point-detonating). The round was likely dropped from a P-39 aircraft and is not related to site activities. The team also met with Harold Nakamo (representative for Makami Farms). Mr. Nakamo indicated the greatest concentration of bomb remnants he observed was at irrigation circle #16 (USACE, 1995b).

An ASR was issued in June 1997. The ASR documented that the Cold Springs Precision Bombing Range was used for practice bombing using the M38A2, practice bombs (USACE, 1997). Numerous M38MA2 remnants littered the northern and southern slopes of the target area. No intact spotting charges were found. There is no historical evidence that the range was ever used for gunnery practice.

A PA/SI was conducted by Weston for the EPA in 2004. Field sampling was conducted in December 2004 and the PA/SI report was issued to the EPA on April 25, 2005 (Weston, 2005a). The following summarizes the PA/SI:

- Soil, sediment, surface water, and groundwater samples were collected at potentially contaminated source areas and from areas that may have been contaminated by the migration of contaminants from their respective sources and analyzed to characterize the potential sources (i.e., the target area).
- Contaminants of concern included TAL metals, nitrogen-based explosive compounds (NBECs), and perchlorate.
- A total of 26 characterization samples were collected and analyzed.
- Three surface soil and three subsurface soil samples were collected at the bombing target in an area with the most concentrated practice bomb debris.
- One soil sample was collected from the inside of a bomb casing located at the bombing target.
- One soil sample was collected from the caliche soil located northwest of the bombing target. Perchlorate may occur naturally in caliche soil.
- Seven surface water and six sediment samples were collected from various downstream locations.
- Five groundwater samples were collected from privately owned domestic wells located within 3 to 9 miles from the Bombing Target.
- Additionally, one each of a surface soil, sediment, and surface water background sample was collected.
- All samples were analyzed for TAL metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc), NBECs, and perchlorate (Method 314.0). Additionally, all surface water and groundwater samples were also analyzed for perchlorate by EPA Method 8321A-modified. Five surface water samples also were analyzed for pesticides and polychlorinated biphenyls (PCBs).

- For groundwater, the metals were not significantly above background. Perchlorate was detected in three of the five samples (0.25 to 1.2 micrograms per liter [$\mu\text{g/L}$]). NBECs were not detected. Even though a large perchlorate plume is present in the area, perchlorate was not used in the munitions associated with this range.
- For sediments, metals were detected above background levels. Perchlorate and NBECs were not detected.
- For surface water, metals were detected above background. Perchlorate was detected in all seven samples at concentrations ranging from 0.035 $\mu\text{g/L}$ to 12 $\mu\text{g/L}$. NBECs and pesticides/PCBs were not detected.
- For soils, metals were detected above background. Perchlorate was detected in one sample (SS-CB001) at 0.83 milligrams per kilogram. NBECs were not detected.

II. DESCRIPTION OF ON-SITE ACTIVITIES:

<input checked="" type="checkbox"/> Walk Through	<input type="checkbox"/> Drive Through	<input type="checkbox"/> Fly Over
<input checked="" type="checkbox"/> On-Road	<input checked="" type="checkbox"/> Off-Road	<input checked="" type="checkbox"/> On-Path
<input checked="" type="checkbox"/> Off-Path		
<input type="checkbox"/> Other Specify		

Activities/Tasks to be Performed:

Reconnaissance

A visual field reconnaissance survey by a trained, unexploded ordnance (UXO) technician using a hand-held magnetometer will be performed on select portions of the Cold Springs Bombing Range to look for evidence of munitions activity and to assure that personnel avoid any potential MEC. Several meandering transects will be walked during which visual observations and magnetic anomalies will be noted. Transects will be recorded using a global positioning system (GPS), and appropriate features influencing the survey will be noted, such as vegetation density and type, topography, etc. Suspect areas of interest, as indicated in the SSWP, will be inspected as part of the field reconnaissance. The reconnaissance team will locate, identify, and stake sampling locations within these areas. If MEC is found, the qualified UXO technician will attempt to make a determination of the hazard, and appropriate notifications will be made as detailed in the *Type I Work Plan, Site Inspections at Multiple Sites* (Shaw, 2006) and the SSWP.

The following conditions at each planned sampling location will be documented or recorded in the field logbook and/or by digital photographs:

- Presence or absence of MEC, shell casings, bullets, or debris,
- Coordinates of staked sampling locations (using a hand-held GPS unit),
- Access limitations,
- Vegetative cover,
- Soil conditions, and
- Other conditions encountered that impact sample collection.

The site reconnaissance will be performed by conducting a visual and geophysical inspection of the range. The geophysical inspection will be accomplished using a Schonstedt by the UXO technician. The path walked during the visual reconnaissance will be recorded using a hand-held GPS unit. Reconnaissance will not include detailed mapping. The reconnaissance will be concentrated in the bombing target area. The reconnaissance path will include the areas where practice bomb debris was observed during the ASR site visit and the PA/SI (Weston, 2005). Reconnaissance will also extend into other selected portions of the FUDS, mainly into crop circle #20. The area near crop circle #20 is reportedly where a 37-mm point detonating artillery round was discovered; however, it is not from site-related activities. The range was not designed or used as a 37-mm site. The anticipated total length of the proposed meandering reconnaissance path is 27,000 linear ft. Touching or handling of MEC or munitions debris will not be allowed.

Sampling (Soil and Sediment)

Six surface soil samples are proposed at the FUDS. Surface soil samples will be collected at a depth of approximately 0 to 6 inches bgs. Surface soil samples will be composite samples (7-point, wheel pattern with a 2-foot radius). No subsurface samples are planned. The exact location of the samples will be determined in the field based on the reconnaissance survey.

One soil sample will be collected near the reported center of the bombing target and in the vicinity of the center pivot of irrigation circle #16. The other surface soil sample will be collected outside the center of the bombing target area but within the FUDS in an area between crop circles, which have not been impacted by irrigation. The samples will be analyzed for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel). The list is based on the expected metals from the munitions (bomb casing and fuze). Only black powder explosives were known to be used. During the TPP meeting, it was recommended, and agreed by the ODEQ, that the samples be analyzed for metals and explosives. However, after reviewing the results of the PA/SI (Weston, 2005a), which analyzed samples for NBECs and the fact that explosives were not used at the site, it was recommended in the TPP Memorandum (Shaw, 2007) that samples not be analyzed for explosives.

Four contingent surface soil samples will be collected within the FUDS at a location determined in the field based on visual reconnaissance. The samples will be analyzed for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel).

By agreement of the TPP team, one sediment sample will be collected to evaluate the surface water/sediment pathway. The one sediment sample will be collected in an area within and downgradient of the Bombing Target. The sample would be analyzed for select metals (aluminum, chromium, copper, iron, lead, manganese, and nickel).

No groundwater or surface water sampling is planned.

III. SITE PERSONNEL AND RESPONSIBILITIES:

Name/Responsibility	Training					
	HAZWOPER 40-hour	8-hour HAZWOPER refresher	Hazardous Waste Site Supervisor	First Aid	Cardiopulmonary Resuscitation	UXO Specialist
Anthony Searls Technical Lead	X	X	X	X	X	
Field Team Leader/SSHO Anthony Searls	X	X	X	X	X	
UXO Technician David Watkins (#1420), Rob Irons (#1137), Jim Bayne (#1212), Rueben Rhodes (#0169), Ron Stanfield (#1161), or Dave Van Deman (#1057)	X	X		X	X	X

IV. HAZARD ANALYSIS:

A. SAFETY AND HEALTH HAZARDS ANTICIPATED:

<input checked="" type="checkbox"/> Heat Stress	<input checked="" type="checkbox"/> Cold Stress	<input checked="" type="checkbox"/> Tripping Hazard
<input type="checkbox"/> Noise	<input type="checkbox"/> Electrical	<input type="checkbox"/> Falling Objects
<input checked="" type="checkbox"/> Foot Hazard	<input type="checkbox"/> Biological	<input type="checkbox"/> Overhead Hazard
<input type="checkbox"/> Radiological	<input type="checkbox"/> Confined Space	<input type="checkbox"/> Water
<input checked="" type="checkbox"/> Explosive	<input checked="" type="checkbox"/> Climbing	<input type="checkbox"/> Flammable
<input type="checkbox"/> Other Specify		

B. OVERALL HAZARD EVALUATION:

<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Unknown
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Justification:

Documentation indicates that the Cold Springs Precision Bombing Range was used for practice bombing using the M38A2, practice bombs (USACE, 1997). Numerous M38MA2 remnants littered the northern and southern slopes of the target area. No intact spotting charges were found. There is no historical evidence that the range was ever used for gunnery practice.

V. SITE INSTRUCTIONS FOR MEC AVOIDANCE:

See Section 4.3 of the SSHP for full scope of MEC avoidance requirements.

- DO NOT touch or move any ordnance items regardless of the marking or apparent condition.
- DO NOT visit an ordnance site if an electrical storm is occurring or approaching. If a storm approaches during a site visit, leave the site immediately and seek shelter.
- DO NOT use radio or cellular phones in the vicinity of suspect ordnance items.

- d. DO NOT walk across an area where the ground cannot be seen. If dead vegetation or dead animals are observed, leave the area immediately due to potential chemical agent contamination.
- e. DO NOT drive vehicles into suspected MEC areas; use clearly marked lanes.
- f. DO NOT carry matches, lighted cigarettes, lighters, or other flame producing devices into a MEC site.
- g. DO NOT rely on color codes for positive identification of ordnance items or their contents.
- h. Only the on-site UXO Specialist is allowed to approach suspected ordnance items to take photographs, and prepare a full description (take notes of the markings or any other identifiers/features).
- i. The location of any ordnance items found during the site investigation should be clearly marked so it can be easily located and avoided.
- j. Always assume ordnance items contain a live charge until it can be determined otherwise.

Section 4.3 of the SSHP defines on-site MEC avoidance requirements for FUDS properties. In general, the purpose of MEC or anomaly avoidance during SI activities is to avoid any potential surface or subsurface anomalies. Intrusive anomaly investigation is not authorized during MEC avoidance operations. The reconnaissance and sampling field work shall include a minimum of two people, one of whom shall be a UXO technician. This team will be on-site during all sampling activities. Sampling personnel must be escorted at all times in areas potentially containing MEC until the UXO team has completed the access surveys and the cleared areas are marked. If anomalies or MEC are detected, the UXO team will halt escorted personnel in place, select a course around the item, and instruct escorted personnel to follow. If MEC is encountered, Shaw will stop work in the vicinity and make notifications as outlined in the Work Plan. Shaw is not to conduct further investigation or removal of any MEC.

VI. SITE CONTROL AND COMMUNICATIONS:

A. SITE WORK ZONES:

Rigid demarcation of work zones, e.g., using barricades or caution tape, will generally not be required for this project. If site conditions warrant the use of demarcation of work zones, the Field Team Leader/Site Safety and Health Officer (SSHO) shall notify the Project Manager/Technical Lead of the change in work conditions and wait for further instructions. If approval is given to proceed, the following procedure will be followed (change in work conditions will be documented in the logbook): The Field Team Leader/SSHO, in consultation with the UXO Technician, will determine the boundary of an Exclusion Zone (EZ) to be established around a specific area of activity, appropriate to the potential hazards. The boundaries may be described by physical features, e.g., fences, tree lines, or topographic features, or may be defined by a radius around the center of activity. The EZ boundary will be verbally communicated to team members, who will maintain a watch to assure that only field team members are within the work zone. If a bystander or intruder approaches the EZ, the field team will cease work and ask the person to remain outside the area. A Contamination Reduction Zone (CRZ) will generally not be required because personnel decontamination is not anticipated.

If required, a CRZ will be established in a manner similar to that described for the EZ. The support zone will consist of all portions of the site not defined as an EZ or CRZ.

B. COMMUNICATIONS:

(1) ON-SITE: Verbal communications will be used among team members to communicate to each other on-site. If this communication is not possible, the following hand signals will be used.

GRIP PARTNER'S WRIST OR BOTH HAND AROUND WAIST – Leave the area immediately.

HAND GRIPPING NOSE – Unusual smell detected.

THUMBS UP – OK, I am alright or I understand.

THUMBS DOWN – No, negative.

(2) OFF-SITE: Off-site communications will be established at the site prior to the start of field activities and may include an on-site cellular phone or the nearest public phone or private phone that may be readily accessed.

☒ Cellular Phone: (509) 531-9028

☐ Public/Private phone

TELEPHONE NUMBERS:	
1. MEDICAL FACILITY (Emergency Care): Good Shepard Community Hospital, Hermiston, Oregon	(541) 667-3400
2. MEDICAL FACILITY (Non-Emergency Care Shaw-Approved Occupational Health Clinic): Lourdes Business Health Services, Pasco, Washington	(509) 546-2222
3. Oregon State Police: MEC Notification: Mr. Dennis Wagner	(541) 276-3629
4. FIRE DEPARTMENT: No local fire department	Call 911
5. POLICE DEPARTMENT: Umatilla County Sheriff	(541) 966-3600 or 911
6. POISON CONTROL CENTER:	(800) 222-1222
7. SHAW NOTIFICATION HOTLINE	(866) 299-3445
8. HEALTH RESOURCES Shaw treatment authorization	(800) 350-4511
9. USACE MM DC PROJECT MANAGER: John Miller	(402) 221-1618
10. USACE DISTRICT PROJECT MANAGER: Michael Nelson, P.E.	(206) 764-3458 (office) (206) 390-9873 (cell)
11. USACE OE Safety: Glenn Marks	(402) 221-7683 (office) (402) 740-4954 (cell)
12. SHAW PROJECT MANAGER: Peter Kelsall	(303) 793-5252 (office) (303) 981-8435 (cell)
13. SHAW TECHNICAL LEAD: Anthony Searls	(509) 946-2062 (office) (509) 531-9028 (cell)
14. SHAW FIELD LEADER: Anthony Searls	(509) 946-2062 (office) (509) 531-9028 (cell)
15. SHAW OE SAFETY: Brian Hamilton	(303) 690-3117 (office) (303) 809-0416 (cell)
16. SHAW UXO TECHNICIAN: David Watkins, Rob Irons, Jim Bayne, Rueben Rhodes, Ron Stanfield, or Dave Van Deman (Contact: Morey Engle)	(303) 690-3870 (720) 480-3204 (Cell)

(3) EMERGENCY SIGNALS: In the case of small groups, a verbal signal for emergencies shall suffice. The emergency signal for large groups should be incorporated at the discretion of the UXO Technician.

☒ Verbal

☐ Nonverbal (Specify)

VII. EMERGENCY RESPONSE:

(1) ACCIDENTS: Safety-related incidents and accidents will be immediately reported to the Shaw Project Manager and the USACE MM DC Project Manager. Additional notifications within the USACE organization will be coordinated by the USACE MM DC Project Manager. Additional accident reporting responsibilities of Shaw personnel are described in Section 1.9 of the Accident Prevention Plan.”

(A) **In the event of a life-threatening injury, call 911 for local emergency services.**

(B) The following is the nearest facility with emergency care:

Good Shepard Community Hospital, Hermiston, Oregon

(2) DIRECTIONS TO THE NEAREST HOSPITAL/MEDICAL FACILITY:

Good Shepard Community Hospital
610 Northwest 11th Street
Hermiston, Oregon 97838
(541) 667-3400

See next page for map.

Figure 1: Directions to Good Shepard Community Hospital, Hermiston, Oregon from County Road 1172, Hermiston, Oregon (Cold Springs Bombing Range)

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Start: County Road 1172
End: 610 Northwest 11th Street,
Hermiston, Oregon

Distance: 12.4 mi
Time: 26 Minutes



<http://maps.live.com/PrintableMap.aspx?mkt=en-US&a=true>

9/5/2007

Directions	Distance	Detail Map
Start: Depart County Road 1172 / Kosmos Rd (east)	0.4 mi	
1: Turn LEFT (north) onto road	2.8 mi	
2: Turn LEFT (west) onto County Road 1258 / E Walls Rd	3.1 mi	
3: Bear LEFT (southwest) onto SR-207 / Hermiston Hwy	5.9 mi	
4: Turn LEFT (south) to stay on SR-207 / NW 11th St	0.2 mi	
End: Arrive at 610 Northwest 11th Street, Hermiston, Oregon		

<http://maps.live.com/PrintableMap.aspx?mkt=en-US&a=true>

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(3) CLINIC FOR NON-EMERGENCY MEDICAL TREATMENT:

In the event of a work-related, non-life threatening injury, the following occupational health clinic is approved by Health Resources for medical treatment of Shaw employees:


Lourdes Business Health Services, Pasco, Washington

Notifications per section VII. (1), above, and to Health Resources (800-350-4511) are required prior to transporting the employee to the clinic.

Figure 2. Directions to Lourdes Business Health Services, Pasco, Washington from County Road 1172 Hermiston, Oregon (Cold Springs Bombing Range):

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 Live Search

Start: County Road 1172
End: 9915 Sandifur Parkway, Pasco, Washington

Distance: 50.6 mi
Time: 55 Minutes



<http://maps.live.com/PrintableMap.aspx?mkt=en-US&a=true>

9/5/2007

Directions	Distance	Detail Map
Start: Depart County Road 1172 / Kosmos Rd (east)	3.4 mi	
1: Turn LEFT (north) onto SR-37 / Pendleton-Cold Springs Hwy	13.6 mi	
2: Turn RIGHT (north) onto ramp toward I-82 West / US-395 North	0.2 mi	
3: Merge onto I-82 North / McNary Hwy West (northwest)	0.8 mi	
4: Entering Washington		
5: Stay on I-82 West (northwest)	19.6 mi	
6: At exit 113 , take ramp RIGHT to US-395 North / Evergreen Hwy	5.4 mi	
7: Take ramp LEFT to US-395 North	2.1 mi	
8: Take ramp LEFT to I-182 West	4.9 mi	
9: Take exit 7 RIGHT toward Broadmoor Blvd	0.4 mi	
10: Turn RIGHT (north) onto Broadmoor Blvd	0.2 mi	
11: Turn RIGHT (east) onto Sandifur Pkwy	0.1 mi	
End: Arrive at 9915 Sandifur Parkway, Pasco, Washington		

<http://maps.live.com/PrintableMap.aspx?mkt=en-US&a=true>

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VIII. PERSONAL PROTECTIVE EQUIPMENT:

For field work to be performed at this site, Level D is required. Level D Protection requirements are defined in Section 5.1.5 of the SSHP. In general, the use of hard hats is required on all USACE work sites, except on MEC-contaminated sites. At this FUDS, hard hats will only be worn if an overhead hazard is identified. If hard hats are worn, they will be securely fastened to the wearers head (e.g., by a chin-strap).

Contingency: Evacuate site if higher level of protection is needed.

IX. DECONTAMINATION PROCEDURES:

Decontamination procedures are not anticipated as Level D PPE is being used. If decontamination is deemed necessary, procedures defined in Section 7.0 of the SSHP of the Work Plan will be followed. Team members are cautioned not to walk, kneel, or sit on any surface with potential leaks, spills, or contamination.

X. TRAINING:

All site personnel and visitors will have completed the minimum training required by EM 385-1-1 and 29 CFR 1910.120(e). The Shaw Field Team Leader will verify that all on-site personnel and visitors have completed the appropriate training prior to admitting the individuals on site. Additionally, the UXO Technician assigned to this field reconnaissance will inform personnel before entering, of any potential site specific hazards and MEC safety procedures.

XI. GENERAL:

The number of persons visiting the site will be held to a minimum. The UXO Technician can supervise no more than six non-UXO qualified persons while on MEC sites performing intrusive or non-intrusive work. The Field Team Leader may modify this SSHP Addendum if site conditions warrant. All changes to the SSHP require USACE review and concurrence before new procedures can be applied in the field.

XII. SEVERE WEATHER CONTINGENCY PLAN:

Sudden changes in the weather, extreme weather conditions, and natural disasters can create a number of subsequent hazards. Inclement weather may cause poor working conditions including slip, trip and fall hazards to exist. Natural disasters can create many secondary hazards such as release of hazardous materials to the environment, structure failure, and fires.

Weather conditions will be monitored throughout the day by all field team members. Additionally, field personnel should be aware of/informed of daily weather forecasts. Local weather broadcasts and information from a severe weather alert radio will be monitored by the Field Team Leader, SSHO, or designee when the likelihood for severe weather exists. Tornado shelters that may be located in the general area where field work is being performed will be identified. Severe weather may include:

- Tornadoes,

- Thunderstorms (lightning, rain, flash flooding),
- Hail, and
- High wind.

Generally, cellular telephone communication will be used to alert crews to threatening weather. The necessary precautions or response, as directed by the Field Team Leader, to implement the Severe Weather Contingency Plan include:

- Drilling and sampling operations will be suspended when the potential for lightning occurs. Operations may resume 30 minutes after the last observed lightning strike.
- For most types of severe weather, personnel should take refuge in vehicles or inside a designated office.
- In the event of a tornado, personnel should take cover in a basement, ditch, culvert, open “igloo,” or interior room of a strong building. Personnel should be aware that ditches and culverts may fill up with water quickly and should only use these as shelters as a last resort.
- The Field Team Leader must decide what operations, if any, are safe to perform based on existing conditions and anticipated conditions.

Additional information will be developed and communicated to personnel before commencing new tasks or activities. It may be necessary to halt certain hazardous operations or stop work altogether to allow the weather situation to pass.

Routinely monitoring weather conditions and reports may help reduce the impact of severe weather and natural disasters. The best protection against most severe weather episodes and natural disasters is to avoid them. This means seeking shelter before the storm hits. If lightning is a threat, stay away from pipes and electrical equipment and watch for damage caused by nearby lightning strikes.

SAFETY BRIEFING CHECKLIST

SITE NAME: Cold Springs Bombing Range	DATE/TIME: /
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GENERAL INFORMATION

(Check subjects discussed)

- ☐ PURPOSE OF VISIT

- ☐ IDENTIFY KEY SITE PERSONNEL

- ☐ TRAINING AND MEDICAL REQUIREMENTS

SPECIFIC INFORMATION

- ☐ SITE DESCRIPTION/PAST USES

- ☐ RESULTS OF PREVIOUS STUDIES

- ☐ POTENTIAL SITE HAZARDS

- ☐ MEC SAFETY PROCEDURES

- ☐ SITE SOPs

- ☐ SITE CONTROL AND COMMUNICATIONS

- ☐ EMERGENCY RESPONSE
 - ☐ LOCATION OF FIRST AID KIT
 - ☐ EMERGENCY PHONE NUMBERS & LOCATION
 - ☐ LOCATION AND MAP TO NEAREST MEDICAL FACILITY
 - ☐ PPE AND DECONTAMINATION

Stress the following during the briefing: If hazardous conditions arise, stop work, evacuate the area, and notify the SSHO and Shaw PM immediately.

PLAN ACCEPTANCE FORM

SITE SAFETY AND HEALTH PLAN ADDENDUM FOR

Site Name: Cold Springs Bombing Range

Location: Hermiston, Oregon

I have read and agree to abide by the contents of the Site Safety and Health Plan and this Addendum and I have attended the Safety Briefing for the aforementioned site.

NAME (PRINTED)	OFFICE	SIGNATURE	DATE

Person presenting the safety briefing:

SIGNATURE

DATE